COMPUTERWORLD

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Consumers Get Some Protection With Credit Law

By Joseph Hanlon
CW Staff Writer

WASHINGTON, D.C. – Consumers and credit investigators now have a little extra protection against the harm done by inaccurate and outdated information in data banks, because of a law which took effect Sunday (April 25).

People who are harmed by credit or investigative reports now have a much better chance to find out about and correct errors, albeit after the errors have done some harm.

The law also prohibits some of the most serious credit bureau abuses, but it will not prevent many of the more common errors. In exchange for the new regulation, the reporting agencies have been given a virtual immunity from consumer lawsuits.

The Fair Credit Reporting Act, first proposed over two years ago by Sen. William Proxmire (D-Wis.), was passed in 1969 by the Senate but ignored by the House. It finally was approved when the Senate attached it as a rider to the Foreign Bank Secrecy Bill last fall.

Under the new law, if a person is refused a job based on a credit or investigative report, or he is refused or charged more for credit or insurance based on such a report, the company using the report must tell the person.

He then has the right to ask the reporting agency to show him the contents of his file without charge. (He can see the contents of his file at any time, but in other circumstances there may be a charge.)

If the individual disputes the accuracy of an item in his file, the reporting agency must reinvestigate that item. If the item cannot be verified or proves to be wrong, the reporting agency must inform everyone who received reports in the past six months (two years for employment reports).

If after reinvestigation the reporting agency and the individual still disagree, the individual has the right to enter a statement of up to 100 words. This statement is to be included as part of all future reports, and the consumer can send it to some past report recipients at his own expense.

The strongest provisions of the law concern investigative reports, which

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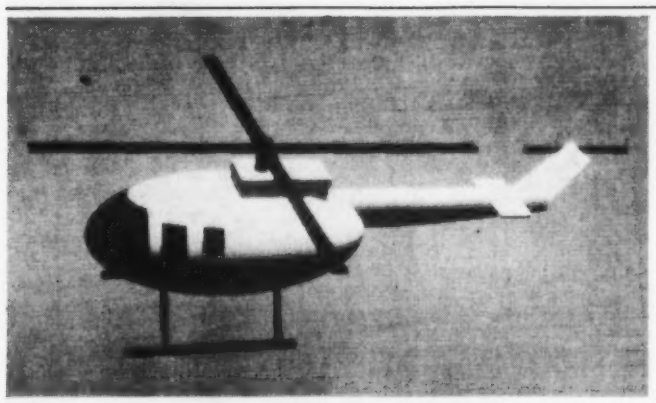

3-D From DP

This flying, three-dimensional helicopter is one frame of a computer-produced motion picture made by a process developed by Mathematical Applications Group, Inc. Story on Page 6.

DPMA Branch Says No To Degree for CDP

By Phyllis Huggins
CW West Coast Bureau

LOS ANGELES – If the Los Angeles chapter is typical, the Data Processing Managers Association (DPMA) is facing a grass roots movement to do away with the college degree requirement for the Certificate in Data Processing (CDP).

At the latest chapter meeting the controversy raged as DP managers said they would rather have people who have been tested on the firing line of experience than rely on a four-year college graduate.

Of more than 60 persons attending the meeting there were only seven who favored the four-year college requirement in a survey circulated by Nelson Cyr, a member who is also a founder of the local Association of Computer Programmers and Analysts chapter.

Herbert B. Safford, chairman of the DPMA certification committee and a candidate for president of the International DPMA, noted: "This trouble is nothing compared to what we have in Canada. There only 10%-15% of the people have college degrees. Here 45% have. Canada is very upset. In the U.S. more than 85% of the applicants have some years of college. Only 30% of the exam takers are even DPMA members. Of all those who took the exam last year, only 39% passed."

When questioned about the power of the popular will, as

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School Head Indicted for Fraud As Students Sue School, Bank

CW Midwest Bureau

AKRON, Ohio – The operator of a chain of now defunct computer schools has been arraigned on nine counts of "larceny by trick" as a result of a two-month Grand Jury investigation.

Shortly after an April 14 hearing in Summit County Common Pleas Court here, 30 former students of Computer Tabulating Institutes (CTI) sued operator Stuart Lowe, and a bank in an effort to get back some of the money they had borrowed to attend CTI.

The former students are also seeking $500,000 in punitive damages from the school. Named as defendants in the "class action" civil suit are CTI, Lowe, the First National Bank of Canton (Ohio) and Earl H. Beil, a former officer of the bank.

CTI, which closed its doors last winter, stranded over 200 programming and keypunch students [CW, Jan. 20] who had financed loans up to $2,000 with the bank in Canton and with various Cleveland finance companies. CTI operated schools in Akron, Toledo and Dover, Ohio.

The suit, filed by the former students on behalf of all former students known or unknown to the court, alleges that the school and the bank "acted in concert to defraud" since both the officers of the school and of the bank knew that the school "could not, and in fact, had no intent to comply" with that portion of the contract made with the students "calling for continued performance over a lengthy period of time."

The suit claims that the contract with the students is unenforceable as far as the bank's demanding payments on the loans made to the students to attend the school. The bank's position, made clear by earlier statements of its officers, is that the loans were personal loans and therefore still owed by the students.

The suit states that the contract authorized only the now defunct schools to collect payments on the loans. The plaintiffs claim in their suit that the bank was aware of that provision in the contract and that attempts by the bank to obtain "written promises of payment [from the students] is unreasonable and unnecessarily oppressive."

The plaintiffs allege in their action that Lowe made claims to the students – after they began complaining of class schedule irregularities, the failure of the school to provide equipment, and began making other complaints on the school's performance – that the school would continue operations.

Also charged with "making misrepresentations" was Beil. The suit claims that he, as an officer of the Canton bank, made repeated assertions to the students that "the school was sound and would continue its course of instruction."

The suit also charges Beil with "inducing" the students to make payments on the loans after the

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'Conspiracy' Charged

IBM Raps CDC 'Club'

By Edward J. Bride
CW Staff Writer

MINNEAPOLIS – Calling a series of mergers an international "conspiracy," IBM said Control Data Corp (CDC) should be forced to divest itself of Commercial Credit Corp. (CCC) and "over 50 competitors, customers and suppliers" of DP equipment.

The "conspiracy" has "substantially lessened competition," IBM complained last week, "through concealed and elaborate financial mechanisms."

The charges were made as part of the lengthy discovery portion of an antitrust suit filed against IBM by CDC in 1968.

IBM's 66-page counterclaim, filed in the U.S. District Court here, said the "conspiracy . . . is referred to as 'the Club' by CDC" and was formed for "dividing and allocating markets and products" and for the purpose of "jointly designing, developing, manufacturing and marketing a single, common line of data processing equipment."

IBM claimed the "Club" was formed "with other domestic and foreign competitors, and certain foreign governments." These would include Britain's ICL and France's CII, participants in a marketing agreement announced last fall.

CDC asked Judge Philip Neville to dismiss the charges, and his ruling is expected "in weeks, rather than months," one source noted.

Company officials and attorneys declined further comment until Neville issues the ruling.

The mergers bolstered CDC's plans for "restraint of trade and substantial lessening of competition in the data processing industry," the industry leader com-

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Chapter Opposes Degree for CDP

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exemplified at the Los Angeles chapter meeting, to remove the four-year college requirement, James Cook, international director, said: "I can assure you that the will of the people will be expressed on the floor of the national meeting in Houston, and earlier at the May regional meeting."

Member Safford explained that the national certification board is not under the influence of the directors of DPMA, but is a special group appointed by the president and beholden to no one.

According to Safford's statements, the objections of a local group are an ineffectual and arbitrary expression that can have little or no effect. The Certification Council is a self-perpetuating group, appointing its own replacements except for two choices by the president, and it is totally autonomous.

It is questionable how much influence local chapters and members of DPMA can exert upon this powerful six-man council, he said.

James A. Case held that unanimity among the chapters could not help but have influence. Safford held firm in that the requirements are the writing on the wall of the future, that IBM now hires only programmers who have had four years of college, and that other corporations are doing the same.

Ray Lauren, a panelist favoring the degree requirement, said that it is more difficult to get into management ranks and the four-year requirement shows that the applicant can hold up under some pressure and have some general background.

He also felt that the college education was becoming more general and the CDP exams were not concerned just with the present but with the future complexion of EDP employees.

Case questioned whether the CDP exam was a testimonial to ability, experience or company loyalty, or to a mastery of the body of knowledge which comprises the industry. He challenged the relevance of the exams and their secrecy.

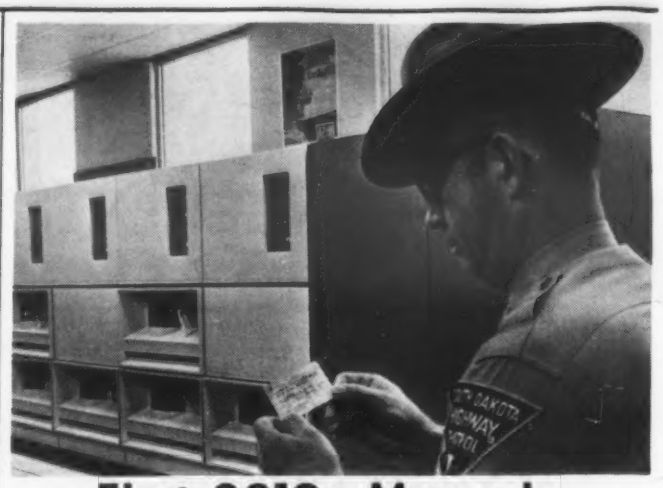
He concluded by saying, "Let's define the body of knowledge so that the certificate really means something. Let's publish better study guides, and let's clothe the industry with respect and get rid of the mystique once and for all."

A member of the audience said, "Every time I hire someone it is a guessing game. I guess that he has the qualities I want and that he will be loyal to the company. He guesses that he will like the company. Credentials, experience, all this means something, but most of all it is a guessing game. Four years of college – unimportant in the overall picture."

Another member of the audience said,"This is too dynamic a field. I don't think we're ready to become stuffy just yet."

Several comments were made about the CPA exams, where expertise in the field is the criterion and the exams carry respect and confidence.

The uproar over the CDP four-year college requirement seems more than just a controversy over one requirement, but deals with the worth of the CDP itself. Many members of the audience said that after 10 years the CDP exam still means nothing.



First 2319s Move In

South Dakota has installed the first IBM 2319 disk storage units, enabling major expansion of its computer operations. The units will allow nearly 700 million characters of information to be electronically stored in the computer. As a first step in expansion of its computer applications, the State Highway Patrol radio information network is relying on the increased computer capability. Highway police can now call on their car radio any of six remote stations which have access via a terminal to a central IBM 360/40 in Pierre.

School Operator Charged With Fraud

(Continued from Page 1)

school had closed and had ceased to provide "effective instruction."

In other actions filed against CTI and its officers (Lowe and his brother-in-law, Ralph Miller, both of Cleveland suburbs), Ace Finance, Professional Service and Consumer Credit Corp. have filed separate suits in Cuyahoga County [Cleveland] Common Court totaling $122,527 for monies due them since the closing of the schools.

The three finance companies are not holding those students still stranded by the closings responsible for the loans. In some cases, students report, the companies were able to place some of the stranded students in other EDP schools.

A former student who paid $1,595 in cash for his schooling has filed suit in Stark County Common Court for the return of his money and $20,000 punitive damages. The suit in Stark County is against the school, Lowe and Miller.

A student from Canton has filed in Stark County a suit against the bank for relief of her loan, $5,000 punitive damages, and $1,000 compensation for driving to Akron to attend the school. The student is claiming that she was fraudulently enrolled.

All of the suits in Stark, Summit and Cuyahoga counties claim the defendants are charged with "intent to deceive and defraud."

The criminal action against Lowe was filed after the Grand Jury heard testimony from more than 50 witnesses, county prosecutor Robert E. Mohler told CW.

The civil suit was filed a few days after Lowe was arraigned on the criminal charges. Lowe has been released on $5,000 bond, Mohler reported, and the trial is not expected to start until fall because of Summit County's heavy court load, he added.

Credit Law Gives Consumer Protection

(Continued from Page 1)

frequently include interviews with "enemies" and neighbors, and which are commonly used when a person applies for a job or insurance. Under the law, a person must be informed of such an investigation within three days after it is requested. Furthermore, adverse information which is more than three months old cannot be used unless it is reverified.

The law also covers another area of abuse – public record information such as arrests and lawsuits. In the past many credit bureaus collected data on arrests and lawsuit filings, but did not bother with acquittals and lawsuit settlements. The new law requires credit bureaus to either keep public record information up to date or to notify the consumer every time a public record item has been filed.

Bankruptcies are erased after 4 years: judgments, suits, arrests and other negative information are erased after 7 years.

Cut 'Fishing Expeditions'

One provision of the law is intended to eliminate "fishing expeditions" that the Internal Revenue Service and the FBI commonly conduct by searching large numbers of credit files. But the law still permits government agencies to have access to the files on anyone under consideration for a license, security clearance "or other benefit granted" by a government agency.

A booklet on the credit aspects of the new law is available free from the Associated Credit Bureaus, 6767 Southwest Freeway, Houston, Texas, 77036.

Will IRS Change Ruling On Software Deductibility?

By a CW Staff Writer

WASHINGTON, D.C. – Computer users may soon lose the option of capitalizing or expending the costs of independently developed software, if the Internal Revenue Service follows through on an anticipated ruling.

Currently, users are permitted to write off outside specially developed software costs as business expenses in one year, or deduct depreciation over a five-year period, as long as they are consistent in their bookkeeping.

The IRS has apparently taken a second look at that policy, and may require users to depreciate these software expenses, according to R. Calvin Elliott, executive director of the Data Processing Management Association.

Elliott claimed the ruling in question would prohibit users from continued expending of systems engineering and programming service.

"Instead, the taxpayer must capitalize such costs as an intangible cost and write them off over a five-year period for tax purposes," Elliott complained in a letter to IRS.

A spokesman for the tax agency would not disclose the status of the ruling, but did admit "we have considered the issue."

Noting the agency normally does not grant hearings on rulings, the spokesman did say, "We're planning to get together with a few people, including a representation from DPMA, to discuss the matter."

If the ruling is issued, Elliott contended it would be a hardship on smaller companies "who cannot afford their own systems and programming people," as well as those "that must always have others create and customize software packages for them."

Elliott stated the contemplated ruling would also "invoke a severe hardship on thousands of service bureaus, software houses and the like, as well as computer manufacturers who supply such services."

IBM Claims CDC 'Conspiracy'

(Continued from Page 1)

plained.

The merger with CCC, a finance company, "extended and broadened" CDC's practice of selling and leasing computers through "reciprocal business practices," IBM summarized.

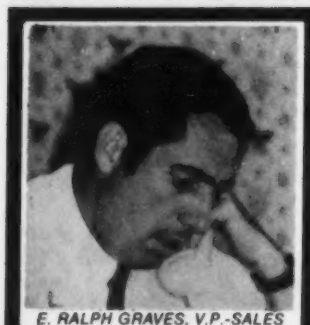
Last year, IBM accounted for more than 65% of the dollar value of new computers, while CDC had 2.8%.

Risc Meeting May See Big Gains

WASHINGTON, D.C. – The Regulatory Information Systems Conference for regulatory commissions and utilities is expected to result in the greatest advance in regulation since the 1930s, according to George I. Bloom, President of the National Association of Regulatory Utility Commissioners (Naruc).

"This meeting, which will be held annually, will provide an opportunity for the commissions to obtain the most current information on computer operations," Bloom said, "and encourage the exchange of data and techniques among the commissions."

The Regulatory Information Systems Conference, presented by the Missouri Public Service Commission under the auspices of Naruc, will be held at the Chase-Park Plaza Hotel in Saint Louis, Mo., May 12-14.



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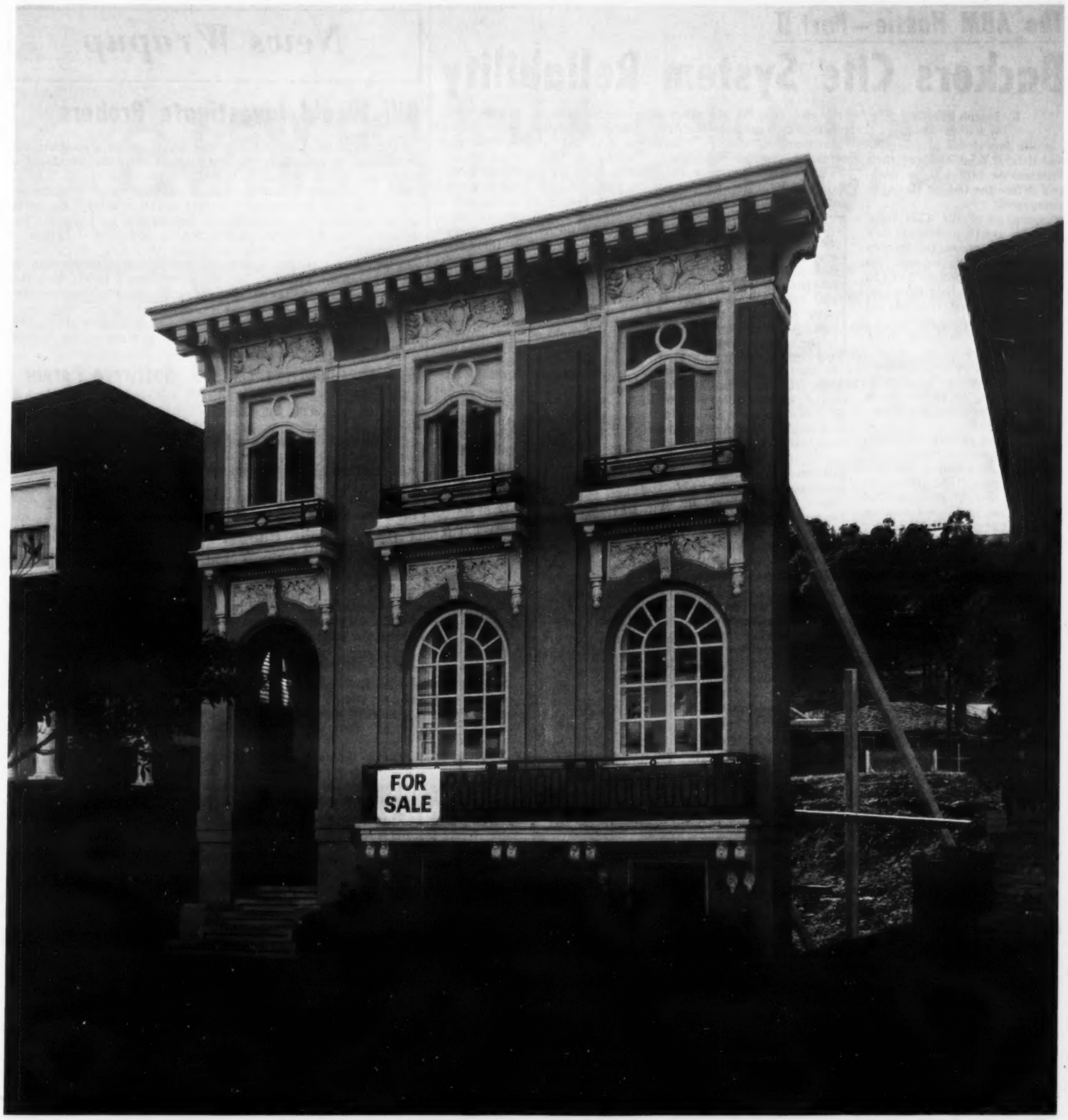

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The ABM Hassle—Part II

Backers Cite System Reliability

By Joseph Hanlon
CW Staff Writer

Is the knowledge of offensive and defensive missiles and their interactions sufficient to properly define the task of the ABM computers?

Supporters of the ABM argue that the overall problem is how well we understand the interaction of one missile and one ABM, because simulation can be used to expand that data into the input the system would get in case of a full-scale attack.

The question is really threefold:

(1) How well do we understand enemy strategy?

(2) In a test, can we sort out an enemy missile from the decoys and intercept it?

(3) Can we perform (2) in the presence of nuclear blasts?

To the first question, one proponent argues: "The offense has the same sorts of problems that the defense has in not wanting to go out and use a big complex system that he has not tested himself. Sure, if you look only at research programs you can see a horrifyingly wide spectrum of possibilities, but when it comes down to the real stages of systems development, the range of possibilities is much narrower.

Furthermore, nobody invents offensive systems overnight – it's hard to believe they would throw anything weird at us without any previous exposure."

The first part of this article presented the ABM backers' contention that with enough time and money simulation is adequate to test and debug the ABM software. Part II gives the ABM supporters' views on several other points raised by opponents.

In tests in the Pacific Ocean, ABMs have successfully intercepted other missiles, according to the Army. "These tests demonstrate that the algorithms work and that in real time they can track a missile and launch and track an interceptor and bring the two together."

Such tests, however, are in a benign atmosphere. In a real missile attack, nuclear blasts would distort and possibly black out the radar, and it is not possible to set off nuclear blasts for tests.

ABM supporters note that some radar experiments were done during the nuclear tests in the 1950s, and that considerable theoretical research has been done since then. They argue that even though the exact effects of nuclear blasts may be unknown, it is possible to put uncertainty brackets on what is expected, and to simulate through that entire uncertainty range.

Will the ABM computers be reliable?

Proponents of the system argue that this is a two-part question: Will the system fire accidentally? And if the system is fired intentionally, how well will it work?

"Prior to an actual attack or prior to some decision time, you can have all sorts of interlocks and make the reliability as high as wanted," claims one supporter. "This system will not act spontaneously on its own."

"Once you are convinced that you are under attack and go into defense mode, you don't need that kind of reliability. If I'm sitting on the ground with umpteen megaton weapons coming at me, I'll take about any chance I can get. I surely don't need 100% reliability – 60% or 70% would be good enough." The only requirement, he continued, is that the reliability be high enough so that the enemy cannot count on the system failing.

The computer systems for the Apollo Project are comparable in size and complexity to those required for the ABM. Despite extensive simulation, the Apollo software has not been fully debugged, and bugs have shown up in flight which if not corrected by programmers on the ground would have aborted the flight. Apollo would not have gotten a man to the moon automatically, why should we expect the ABM to be more successful?

The ABM will be checked out far more extensively than Apollo, according to ABM advocates. "We could have gotten a man to the moon automatically, but we wouldn't have done it on the same time scale. It would have required a different sort of discipline and a different sort of investment in the software," declares one proponent.

"Nasa essentially recodes its packages every shot," he says. "For a while they were producing practically an entire new software package on a three- to six-month basis. They did a lot of simulation and checkout, but the amount they could do in that time period was limited."

ABM supporters also point out the Apollo has been 100% reliable where it counted: "There were many instances in those flights where if something did go wrong they could not have recouped. Nothing happened during those times, undoubtedly because Nasa put a lot more check time into those more critical occurrences."

How Many Snowflakes?

KINGSPORT, Tenn. – Ever wonder how many snowflakes are needed to cover one's home state with 10 inches of snow?

Tennesseans have found out: The number is 27,794,920,909,600,000, according to a group of mathematicians at Tennessee-Eastern Corp.

They determined the size of the average snowflake, and the approximate number of square miles in the state, and put the data in a computer. But they overestimated the size of the state by 756 miles.

News Wrapup

Bill Would Investigate Probers

WASHINGTON, D.C. – A bill that would create a congressional commission to investigate the investigators has been introduced in the Senate by Sen. Gaylord Nelson (D-Wis.).

With a mandate "to investigate the entire range of domestic surveillance and intelligence activities in this country," the group would be called the Congressional Commission on Domestic Surveillance and the Constitutional Rights and Civil Liberties of Individuals.

In introducing his bill, Nelson said that "much of the justification for the current expansion of the government's power to gather information about its citizens and tuck it away in computers without full public knowledge or congressional authorization is based upon the Justice Department's interpretation of a 1940 Presidential order authorizing the use of wiretaps against 'persons suspected of subversive activities.' "

Foreign Countries OK U.S. Software Patent

WICHITA, Kan. – France, England and Italy have all granted patent protection to the holder of the first software patent in the U.S.

Don H. Alldritt, president of Computer Graphics Inc., holder of the Bernhard-Fetter graphics display patent, said his company was still "in the process" of obtaining other international patents for the program.

This was the first software patent approved by those three countries, Alldritt reported.

County Heads Blamed for Lack of DP Guides

TULSA, Okla. – County commissioners are being blamed for not establishing adequate guidelines for DP employees, with consequent errors and tardiness in some computerized reports.

Willard Mason, excise board chairman, claimed the director of county data processing was "put in the job without guidelines," adding the computer difficulties are "a problem of administration."

Girl Friend Gives Big Assist to FBI Computer

WASHINGTON, D.C. – Give the computer half a chance, and no thief is safe.

Sherriff's deputies in Ogle County, Ill., were investigating a series of safe burglaries and questioned the girl friend of one of the suspects.

During the questioning, a deputy noticed a color TV set. The girl, being a model citizen, gave her permission when the deputy asked if he could check the serial number.

The FBI computer revealed the set had been stolen in Iowa.

The suspects were captured after surveillance, and were convicted and jailed.

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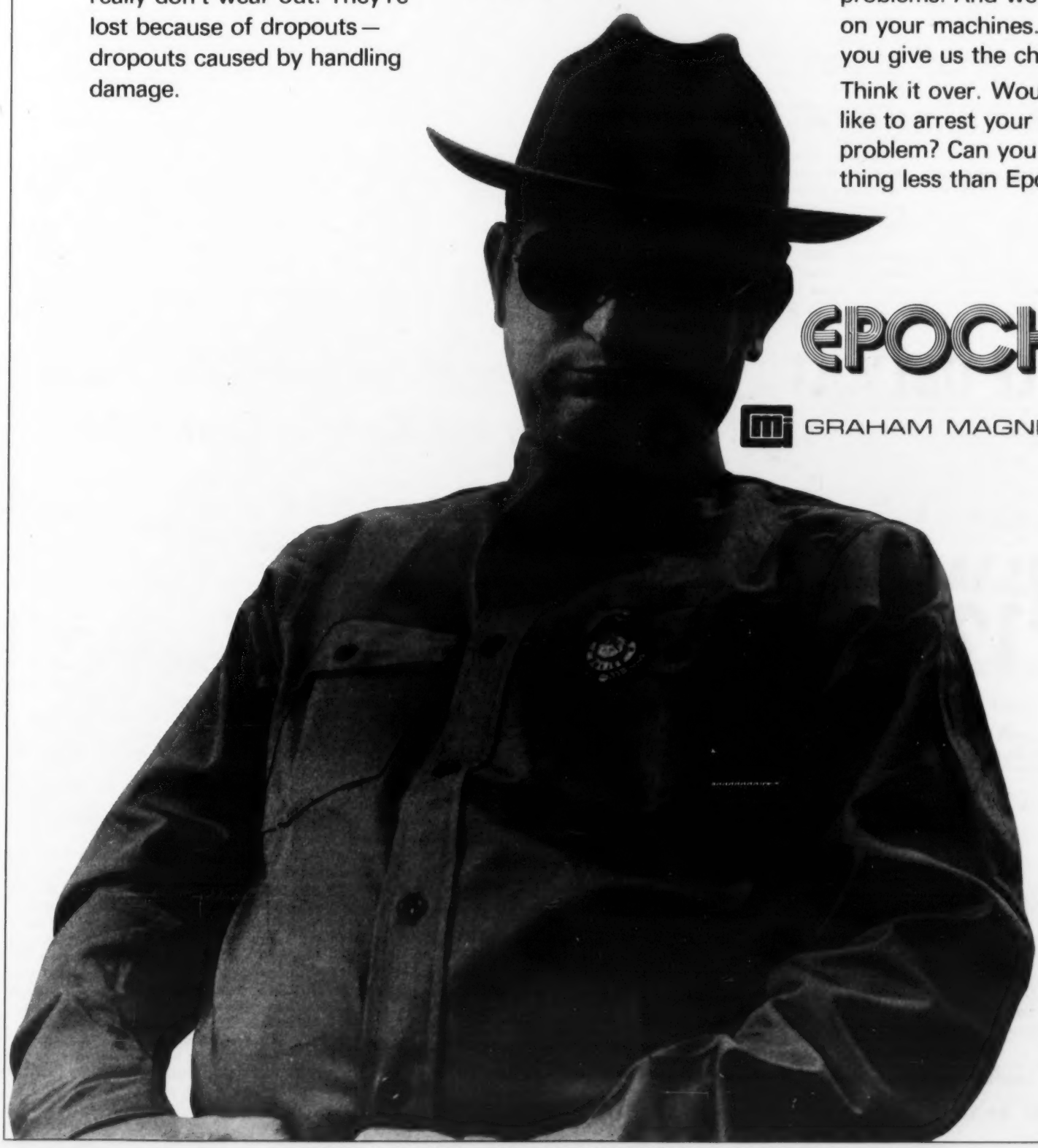

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University to Accept DP Credits From Trade School

By Marvin E. Aronson
CW Education Editor

DALLAS – Take a chance in the labor market after six months' or 12 months' training, work for a college degree in computer technology, or do both.

For students taking part in an innovative, cooperative venture between a technical career school and an institution of higher learning these are very real alternatives.

After a year of study by which they will qualify as systems technicians or programmers, the Elkins Institute students can take an exam prepared by Southern Methodist University (SMU) and receive up to 30 credit hours toward a degree in computer science or business administration from SMU.

Or, after satisfactorily completing six months of study, a student may enter the job market as a programmer.

Under the agreement between the two institutions "SMU will regularly furnish Elkins Institute with information and guidelines that will assist Elkins in updating their courses and enhancing the preparation of their students with a view to maximizing the transfer of credits to SMU."

A student continuing through the college level and working in the EDP field could have three years of practical experience by graduation.

About 25 students are currently enrolled in computer science in Elkins schools in Houston and Dallas. Elkins plans to introduce the course to five of its 20 campuses by the end of 1971.

The 48-week, 1,200-hour course, which costs about $2,500 a year for each student, allows a student to specialize in either the scientific or business applications of DP. He can then choose between the SMU School of Business or the SMU Institute of Technology.

The courses are designed and monitored by SMU professors working as Alpha Systems, Inc. consultants.

Several Languages

The system features a DEC PDP-10 time-sharing system interfaced with a Univac 1108-UCC Cope Unit Processor System, owned by Alpha. The languages offered include Fortran, Cobol, Algol, PL/1, Simscript, Snobol and APL.

Remote batch terminals are linked to a computer system on the SMU campus.

Elkins has also purchased from the Univac Division of Sperry Rand the Univac Education Institute in Houston. In May the school will be moved to Elkins facilities and the two Univac courses – business programming systems analysis and digital computer systems maintenance – will be added to the curriculum.

The program has the blessings of Texas Commissioner of Education J.W. Edgar who noted the students will "get the best of both worlds (college and vocational school) in computer technology education."

The program is designed "to let the student feel his way into the field of electronic data processing on a step-by-step basis. If he is unable to complete the year-long program, he will be able to, leave it with a marketable skill," said SMU Provost Neill McFarland.

3-D Animations Generated by Computer

By Don Leavitt
CW Staff Writer

WHITE PLAINS, N.Y. – A service that produces black and white or color animation of computer-generated, three-dimensional objects has been developed by Mathematical Applications Group Inc. (Magi).

"This is a long step forward because of the realism with which objects with curved surfaces can be visualized," said Dr. Philip S. Mittleman, Magi president. It is also markedly cheaper than comparable systems, he said.

The Magi system is "entirely different" from conventional computer graphics, Mittleman said, noting that the latter normally comprise line drawings of flat-surfaced, two-dimensional objects and project a cartoon-like quality.

Representation

The Magi system is based on a technique for mathematical representation of a camera, a light source and the objects to be pictured.

Programs simulate the light rays and their path from the source to the objects they strike. The rays are then traced to a simulated film in a simulated camera. The resulting data is displayed on a CRT and, by use of standard movie equipment, transferred to movie film.

The Magi system apparently solved, or bypassed the "hidden line problem" which had been a dilemma for some graphic system developers. Other systems are concerned with the problem of when a given line on an object disappears from view, but Magi works only with the reflection of light from the object and not with specific lines on it, Mittleman said.

Meanwhile, a different technique for producing movies that includes shading of three-dimensional objects is being developed at Ohio State University under a National Science Foundation grant.

Project Director Charles Csuri described his approach as one that provides an "electronic blackboard" for users.

The Magi approach requires a specific program or scenario, to be written in a "director's language," for each film being produced. There is no real-time operation with the Magi system.

The Magi process, which can be used to produce slides, still pictures and film strips, has implications for city planning, product design, road building and the arts, the company said.

Before They Exist

One of the most valuable aspects of the system, the company said, is its ability to generate moving pictures of three-dimensional objects before they exist.

In place of the usual static model of a new building or shopping mall a city planner can have a lifelike movie showing the structure as it would be seen by a person walking by it.

Virtually any objects can be described and given form and motion on film, Mittleman said. The manufacturer of earth-moving equipment, for example, could see a proposed new machine in action while it is still in the blueprint stage. The film could depict the equipment's proper acceleration, speed, earth-moving capabilities and other features the manufacturer must determine in advance.

Magi said that it can produce a five-minute movie about a week after all story line information has been developed.

Production costs for computer-made movies now range from $750 to $5,000 a minute, depending on the subject, Magi said, adding that costs will drop to the $500 to $1,500 a minute range "within the next few years." The firm is at 180 South Broadway, 10605.

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Seminar Warned of Higher Phone Rates and Move to Carrier Use

By Ronald A. Frank
CW Technical News Editor

NEW YORK – A prediction that higher telephone rates for data line users will be approved, thus forcing them to subscribe to the services of the specialized common carriers, was made by Dr. William Melody to a group of data experts here last week.

A University of Pennsylvania professor, Melody told a telecommunications seminar on the specialized carriers that AT&T will ask for and get higher intrastate rates for lines used by computers.

Melody told CW that Bell's present rates are based on an earlier noncomputer era and data users have therefore enjoyed lower-than-required rates. Various state regulatory proceedings, such as those where Bell has proposed an Information System Access Line (Isal) rate, will eventually lead to higher data line tariffs, he said.

Telephone rates will rise because Bell basically exerts the power of a monopolist before most regulatory commissions, Melody stated. He added that the new rates would force data users to the new carriers where they probably will get cheaper lines more tailored to their specific needs.

At present only one specialized carrier, Microwave Communications Inc. (MCI), has obtained FCC approval. This allows MCI to operate one communications link between Chicago and St. Louis. But a flood of similar applications from MCI affiliates, Data Transmission Co. (Datran) and others led the FCC to consider whether competition from the specialized carriers should be authorized by a general ruling. This question, known as Docket 18920, is now pending before the commission.

Most of those attending the meeting predicted that the FCC would approve the competitive entry of the specialized carriers. Some said the FCC had already decided the issue in favor of competition and added that a commission announcement to this effect could be expected before the end of June.

The new carriers would force a major change in the manner in which data facilities are offered, Melody said. For years, he said, with only a few established carriers, the user had to adapt his needs to existing facilities.

He cited the use of a telephone system designed for voice traffic but adapted to digital transmission as an example. He predicted that this situation would change with approval of the new carriers to foster a more competitive environment in which several suppliers of data facilities would respond to users' needs.

Applications of the specialized carriers have forced the FCC to take action on whether to allow competition, Melody said. He added that the many responses into the related commission inquiry had a positive effect on resolving the issue at an early date. Points raised by the applicants, he said, had shown the FCC that the existing carriers were in some cases using their frequencies in a wasteful manner.

After interstate approval is given the new carriers by the FCC, he said they will have little trouble getting approval for their services on an intrastate basis.

The session was sponsored by Coenen and Co. to familiarize the banking community with the impact of the new carriers.

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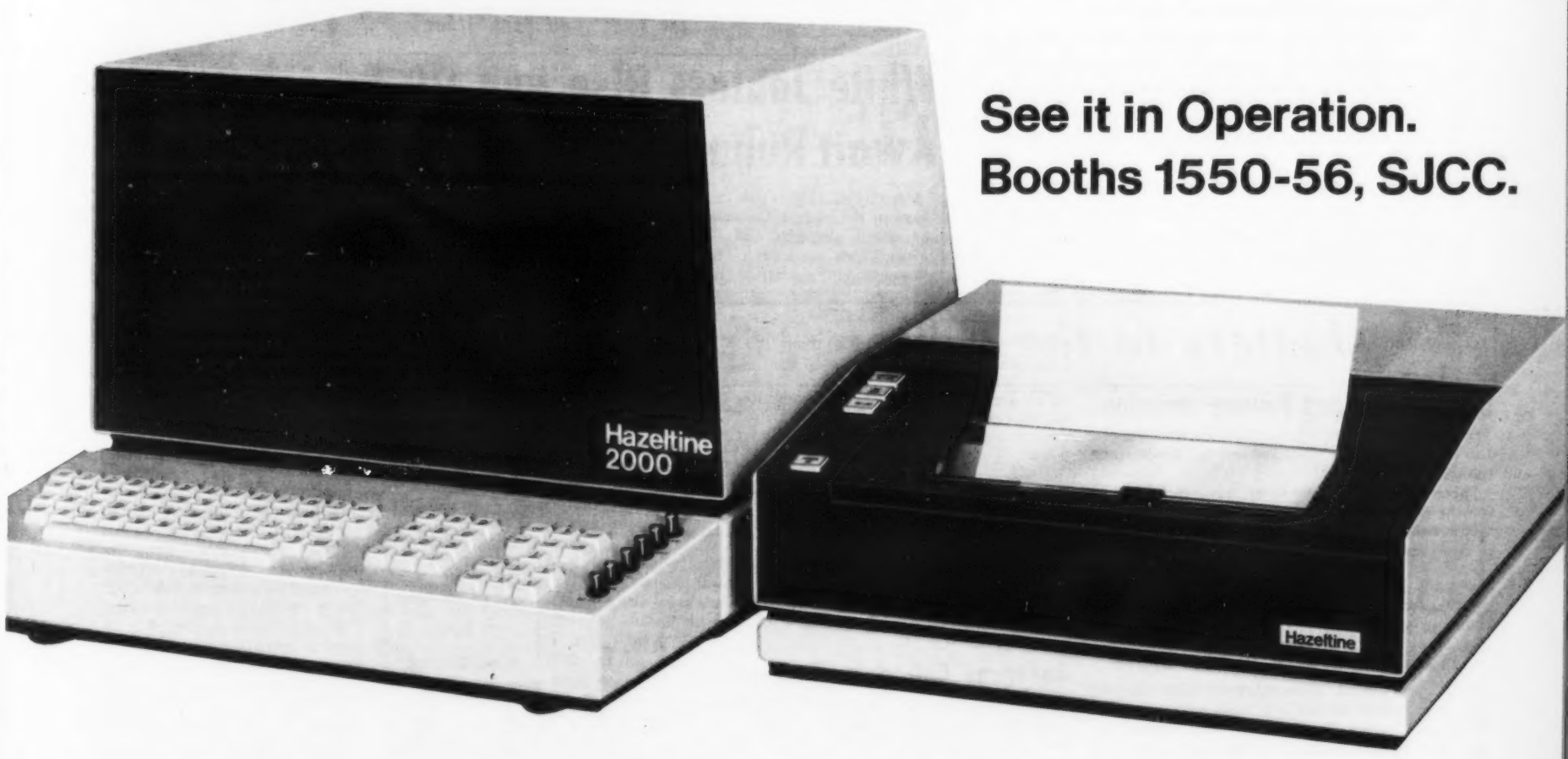

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Editorial

New Ballgame

Recently the independent suppliers, who formerly had made only plug-replacement peripherals, began announcing 400-track disk drives for which there is no IBM equivalent.

From the user's standpoint, this move is both good and bad.

It's good because it increases the variety of peripherals available to the user when he configures a system.

But it's bad because, for the first time, the user could find he has serious backup problems.

Formerly a user of independent peripherals knew that, if his system went down, he could transfer his work to another system because, no matter what the labels on the hardware said, he still had a "standard" system – just like the one up the road.

Now the user is being offered peripherals that will make his system "nonstandard" in the sense that he must find a backup system that includes the same independent peripheral. This might not be easy.

The manufacturers could ease this problem by making their "nonstandard" peripherals compatible with each other. That way, a user wouldn't necessarily have to find a backup system that included a Widget 89 just like his. Instead he could use a system with a Thingamajig 72 or a Whatsit 43.

Unfortunately, the manufacturers apparently haven't given compatibility much thought. We think this oversight (or behind the scenes decision) will unnecessarily hurt both the manufacturers and the users.

'The Gang's All Here, I See . . .'

Letters to the Editor

Onward, Against Privacy Invasion

Hats off to *Computerworld* and its fine writers, Joe Hanlon, Alan Drattell and others, for keeping the issue of invasion of privacy up front.

Those of us in the field must share responsibility for the effects of computer technology. If we, the "experts," fail to lead the fight against the misuse of computer technology, who will?

Robert H. Seidman

Syracuse University
Syracuse, N.Y.

'...From the Cradle to the Grave'

Data banks and privacy, bah! humbug. All computer world people are users of and understand data banks. This silliness about privacy is a big joke. In the computer world there is no such thing as privacy. The only value to all the time, words and paper wasted on this subject is to point out that there are too many data banks instead of one complete good one.

A complete but accurate data bank should be established and maintained by social security number of all citizens from the cradle to the grave. I just ask this question, You got something to hide? bah! humbug.

T. Eickmeyer

Dayton, Ohio

Picturephone Costs 'Distorted'?

It was with interest that we read your story [CW, April 7] about our Alcoa Picturephone Remote Information System (Apris). However, we feel the comparison you printed gave a completely distorted picture of the costs involved.

It is our belief that Picturephone access to a computer using the Apris system is less expensive than CRT systems in most configurations and helps justify the cost of the primary video capability of the Picturephone.

The figures mentioned in the article include only the hardware necessary to support remote access and neglect the units which would be on the executives' desks. It is here that the Picturephone has a distinct advantage with a unit cost of $70. In addition, Picturephone terminal users still have the added capability of a face-to-face communications device plus graphics capability.

In summary, we feel that the potential for the use of Picturephone access to a computer is high, but the cost is not.

Michael L. Coleman
Coordinator of Computer Science Services

Aluminum Co. of America
Pittsburgh, Pa.

We concede that in some configurations Picturephone is less expensive than CRTs. Without its video capability, however, the Bell system is still a limited, relatively high-cost access method to a CPU. Ed.

Coverage Called Inconsistent

Certain inconsistencies appear to be present in your March 31 issue relating to memory devices and their prospects for future use. On Supplement Page 10 your special correspondent, Ned Chapin, extolls the virtue of disks in preference to magnetic tape. Since most users agree that the application must dictate the preferential form of storage, I fail to understand his conclusions in this less then enlightening article.

Supplement Page 6 carries the headline "Bulk Core Seen Replacing Disks in Fourth Generation." In fact, Malcolm L. Stiefel concludes his first paragraph with the phrase "an era will come to an end – the age of disk storage devices."

There appear to be inconsistencies in the memory supplement intended, I would assume, to keep users informed. Your comments would be appreciated.

Robert C. Foley
Vice-President

Graham Magnetics Inc.
Graham, Texas

We don't see the inconsistency. Chapin said, "Magnetic tape still has an important role and remains unchallenged for backup storage and for low-cost, high-capacity applications requiring only serial access." He also pointed out that "high density tape still enjoys a 100-to-1 cost advantage over disk when used on high-speed tape drives." Stiefel points out that disk packs, which Chapin says are gaining greater acceptance now because of their random-access advantages, will be replaced in the future by bulk core as the ideal random-access storage medium. Ed.

While Jobless Rise and DP School Guides Await Ruling, Government Drags Its Heels

D.C. Data-Line
By
Alan Drattell

WASHINGTON, D.C. – The ways of the Federal Government are often plodding and "wondrous." Two examples are unemployment and guidelines for private schools.

For a number of months we have been writing about various activities by the government regarding proposed legislation and retraining programs aimed at easing the unemployment situation in the computer industry.

Unfortunately, little that is tangible has come from these activities. And at this writing, there are indications that an upswing in employment in our business will not begin in earnest until sometime in the fourth quarter of this year.

If you're a systems analyst, data processing manager, marketing man or programmer out of work or underemployed, that's a long time to possibly wait for a job to open up in your area of expertise.

Congress has a number of bills before it at present for consideration. And the Executive Branch has several small pilot retraining programs in the works. But on the basis of previous procrastination and current inertia, the trend indicates that when something substantial does emerge from the federal paperwork and bureaucratic jungle, the emergency situation we now face will be past.

Certainly, few voters, other than those affected directly or indirectly, can become uptight about a $20,000 a year executive being thown out of work. The average worker, who may earn $7,500 a year, or the welfare recipient, cannot empathize with the systems man or programmer who once commanded a salary much higher than anything he ever hopes to earn.

The frustration has been compounded by the relative inaction of the computer community itself.

There have been stabs at "doing something," notably by the IEEE and the Association for Computing Machinery. But these actions have been limited. One reason may have been that many of the volunteers in the society fabric have also been concerned about the possibility of losing their own jobs. Another is that many of the professionals in the societies do not know how to respond quickly when an industry wide dilemma threatens the complacency of a "recession-proof" business.

Concerning the private schools area, here again the government has faltered.

About six months after its hearings on proposed "Guides for Private Vocational and Home Study Schools," the Federal Trade Commission says it may have a decision by late May or early June. I stress the "may have" since an official at the FTC said to check back with him at that time to see if anything has happened.

While the FTC ruminates, potential unsuspecting students are signing up to take private EDP school courses that often describe the DP industry as it was in its halcyon days of 1968 and 1969 and not as it is today – encumbered by the economic recession.

More Jobs?

For example, a recent advertisement from LaSalle Extension University, a correspondence school in Chicago, headlined that the U.S. Department of Labor predicts "115,000 more jobs for programmers." Unfortunately, this prediction most certainly cannot relate to today's market.

And to cast further doubt on Labor's statistics, the department published a guide for college graduates on employment opportunities this June with statistics for the EDP field dating from 1968.

As a result, Labor provided effusive figures regarding the number of programmers and systems analysts employed, their salaries and the projected need in the industry.

Must Users End Up as Losers?

How About Some Standards for Computer Operators?

Recently in this column a number of standards have been proposed for system design and software. But there are other things that may involve standards outside the programming area. One place is in the operating room, for instance.

The Taylor Report
By
Alan Taylor, CDP

I was watching recently while an operator was running a print job. Shortly after it started the user came in and looked at the output while it was flowing through the printer. He was doing this to see whether the output looked reasonable, but he did not stop the printout. The operator was also constantly at the printer because the carbon in the continuous forms was sluing over to the right and bringing the operation to a halt.

Watching Operator Working

They were three part forms, and I watched him as he was working. The first sign of a problem could be seen from the paper itself. The carbon between the first and second copy was off-center – almost touching the sprocket holes on the right while about a half-inch away from those on the left. Still it was covering even the left-most printing position, as could be seen from the printing on the paper.

Shards of carbon paper then started coming through the right hand sprocket hole. First just little bits on the left, and then more surrounding all sides of the sprocket. The off-center position of the carbon between the first and second sheets was still visible just to the right of the sprocket hole, and so it was clear that the carbon that was sluing into the sprocket-hole area was not the first carbon, but that between the second and third sheet.

Shortly after this the machine would stop, the operator would tear a few sheets out of the incoming paper, and would start operation again a few sheets down.

What I noticed he did not do was to check the printing of the third sheet. The printing concerned did start in printing position 1, and the carbon width was not sufficient for him to know that the third sheet was properly printed.

Indeed, if printing can proceed on a printer even when there is a complete carbon sheet over the sprocket holes, then it is practically impossible for him to be able without examining the data to be certain that all the carbon impressions have come through.

Operator Comments

The operator naturally proceeded to complain about the quality of the supplies he was being asked to work with, but he did not make any entry in the logs with regard to lost time.

They were standard supplies, provided by the service bureau itself, not by the customer, so the result was that the customer would be charged for additional time and the service bureau would make more money. All in all it was not a very good operation. And yet I knew it was not very unusual either.

Recently I had watched another operator doing a print job and at about page 3,219 out of a 3,800-page run, it was discovered that the heading was horribly garbled! The heading should have been something like such-and-such annual "TABULATION," and was being printed as "TABULULATION." And this was being done for an outside client!

Again, the result was some furious words but nothing concrete. *Noticeably no one was able to say that any rules had been really broken, or that any unprofessional operations had taken place.*

And yet in both cases the user was not getting a square deal. He was not getting what he had a right to expect.

So Why Not Standards?

In the same way that I think that reasonable software should have standards, I think that reasonable operations should have standards also. I do not know of anyone who has suggested any, so here are two or three which might cover these particular situations.

- Print Inspection Standards
  (a) Printing inspection should be programmed for on all printing jobs by providing a halt for inspection after the first page and a half of printing has been completed. The halt will be lifted only when an approval statement including the identity of the person giving the approval is input at the console. Use of halt and start buttons at the printer is not considered adequate for this purpose.
  (b) All copies of a printout stopped because of carbon slue should be inspected for completeness before the run is allowed to continue.
- Log Entry Standard – Log entries should be made of all types of incidents during a run, not necessarily of each individual incident.
- Supply Standard – Where problems appear to be involving a standard supply the use of the paper should be discontinued, and the matter reported to management for action.

These are operator standards I think are necessary. But are they sufficient? Do we also need some standards of operation of the hardware, and of the supplies?

After all the hardware is designed to run a particular type of paper, and the paper is designed to work on the supplies. If carbon paper appears in the sprockets and does not bring the printing to a halt, even though there is a definite danger of incomplete copies being produced, then the printer or the paper *or both* have failed in their design objectives.

Alan Taylor, consultant, writer, and former editor of *Computerworld*, is president of Computer Management Aids Corp. of Framingham, Mass.

It will be useful to have standards which would safeguard against such failures. Again, I do not know of any such consumer standards but they could be like this:

- If one-third or more of the sprocket hole is obscured by carbon paper or other interfering medium the printer will be brought to a halt.
- Carbon paper between the leaves will be sufficiently wide so that it can obscure a complete sprocket hole without endangering the images previously printed.

Put those two together and you have a system that could work.

My question is – why must we have one that can (and does) fail?

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Primarily Limited to Inventory

Hospital Purchasing Can Profit From Industry DP Use

By John H. Holmgren
Special to Computerworld

Hospital purchasing departments can learn much from industry and government in the application of data processing. This has already been done in several major hospitals in the U.S., but on a limited level.

Hospitals have used the computer primarily in the inventory control functions of purchasing, but many firms, and the federal and state governments, have used the computer to select vendor sources; print purchase orders; obtain repetitive quotations; calculate the lowest bidder; and maintain vendor price files.

Some hospital-institutional purchasing agents are now considering this extension of industrial EDP techniques in purchasing.

A.L. Rankin, chief, Centralized Services Division, Texas State Board of Control, Austin, Texas, assists his agency in doing all of the buying and contracting for Texas state institutions and departments.

"I believe the computer will become the hospital purchasing director's best tool," he said. "We have only scratched the surface. I can see a trend toward EDP use in contract administration, in expediting and payment of orders, and in computerizing output of bid invitations."

Rankin believes that computer runs are "also valuable as a tool to determine buying patterns for the year."

These functions have been considered by hospitals as the more creative, judgment type activities requiring the purchasing director or hospital buyer.

But many industries have seen that there is a repetitive aspect to many of the buying functions, – in obtaining the lowest bid, for example, that lends itself readily to EDP programming.

Hence the new trend in industry and government to utilize the computer for more of these functions.

This additional time gives the purchasing agent and buyers in industry and government an opportunity to exercise more creativity in the non-routine, expensive, one-time purchases, and let the computer do the source selection for the routine orders.

Several years ago, Xerox Corp. divided its purchasing items into three categories: A, B and C. The A group included 80% of the dollars and 5% of the items purchased. The B group included 15% of the dollars spent, and 15% of the items. The C group included only 4% of the dollars but 80% of the items.

It was this last group the firm felt could be computerized because of the repetitive nature of the orders. This gave the buyers more time for categories A and B. Another hospital buyer, Clifford Fisher, echoes Rankin's belief in the validity of more sophisticated EDP for hospital purchasing or material departments.

Director of Material for the University of Massachusetts' Medical School in Worcester, Fisher commented: "Data processing directly to vendors is now a more normal function in many industries and, in a few cases, hospitals. Source selection and product analysis are two other hospital EDP conversion potentials."

In August 1970, a Hospital Financial Management Association (the national hospital accountant's association) survey report of EDP in 3,000 U.S. hospitals showed:

- Hospital EDP is primarily in the business office.
- More than 50% of the hospitals are still using manual information processing methods.
- Most EDP applications are in batch mode, rather than on-line, real time.
- A total of 45% of the hospitals responding cited the integration of EDP to the hospital environment as the most "troublesome" difficulty.

The inventory function is the primary application of EDP in hospital purchasing departments. But even that application was limited to only 515 of the hospitals reporting in the HFMA survey.

John H. Holmgren is assistant administrator at St. Joseph Hospital and Rehabilitation Center, Wichita, Kan.

UK Cites Need to License Data Banks

MANCHESTER, England – The issue of personal privacy exists separately from computers, which nonetheless magnify the problem of privacy invasion by their efficiency and relative lack of security.

This position, taken by the National Computing Centre Ltd., was stated publicly in a memorandum to Parliament, whose Committee on Privacy is examining the need for legislation to safeguard this right.

The memorandum called attention to the fact that the UK is a party to the European Convention of Human Rights; article Eight of that convention provides for a right of privacy.

NCC said that, in order not to violate the convention, data banks of personal information should be licensed by a tribunal with powers to specify conditions of use and to impose penalties for noncompliance.

The memorandum noted that, while preserving the confidentiality of private information, such conditions are important because "information suitable for one purpose may not be suitable for another purpose."

The "lack of adequate standards and codes of practice" results in computer systems' not having "elementary precautions to protect the security and accuracy of data and equipment," NCC stated.

It is within the state of the technology to afford adequate protection, although "there is no absolute system," the memo disclosed. "One simply tries to make the cost of breaking the protection greater than the value of the information . . ."

Since adequate protection, of both the accuracy of data and the data itself, is expensive, the possible compilers of data banks might need legislation, or just the threat of it, to insure the "security needed in many socially sensitive areas."

While not proposing specific legislation, the note did proffer that any legislative control should apply to all nonmilitary government systems, public authorities, public companies, firms providing commercial DP services, and those systems where failure could lead to risk of life (such as traffic control, process control, and medical applications).

The report concluded that the manner of control is a "moral question" not involved with computers, except as they "emphasize the magnitude of the problem."

State to Unify DP Operations In 7-Year Plan

RICHMOND, Va. – Consolidation of EDP workloads is under way as part of a seven-year program to centralize the state's computer operations.

This consolidation phase is expected to be complete around the end of this year, according to state DP Director Gordon W. Mills.

The director said several existing departments were being considered to "host" the computer power: health, welfare and institutions, education, highways (or motor vehicles), agriculture and commerce, plus the Division of Planning, and the Office of Administration.

The seven-year plan was started in 1969 as a "functional centralization" blueprint.

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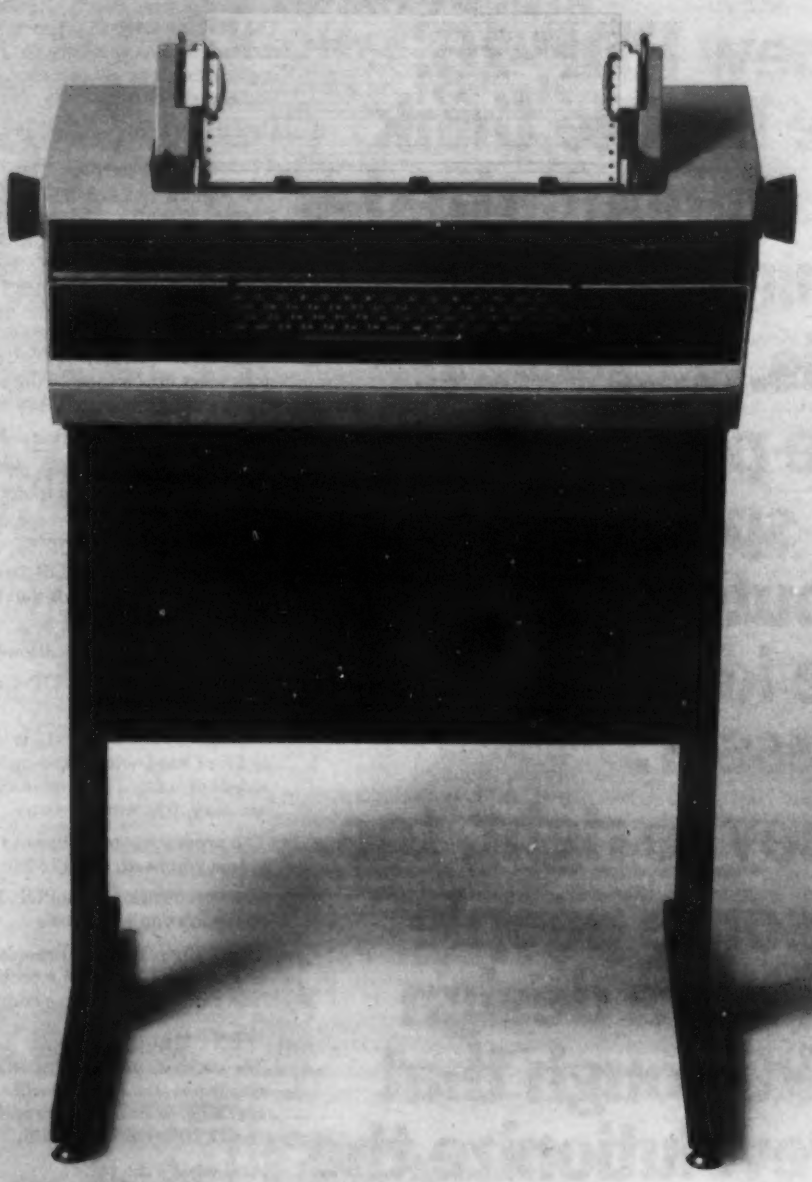

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MEMOREX

Job Seeker Should Prepare for Interview

By Elliot Raphaelson
Special to Computerworld

The successful job interviewer is not necessarily the smartest or most qualified job applicant. He is the man who considers a prospective job interview important enough to prepare properly for it. The interviewer knows that his best employees are not necessarily those with the highest IQ, but those who also demonstrate a proper job attitude and a good planning approach to completing an assignment.

The prospective employee who demonstrates these traits at a job interview will obviously have a better chance for employment than those applicants who do not.

No employer wants to hear the prospective employee say "I really don't have any job objective" or some nebulous statement such as "I'm just interested in getting more experience."

An applicant who cannot define his job objectives clearly will undoubtedly leave a negative impression with the interviewer. It may be impossible to recover from a bad impression left because of an inadequate response.

Most prospective employers fall into several classes, and employment with each of these classes differs with respect to job stability, salary levels, probability of working overtime, opportunity for advancement, education, diversified work opportunity and experience. The prospective employee should consider these factors, in order to make a proper job selection, and also to be able to indicate to his prospective employer that he has considered these factors carefully.

Very rarely does an applicant do his homework with respect to analyzing the company he is interviewing "in advance." The applicant who has detailed knowledge concerning a company in advance of the employment interview is too rare. Because of this, the applicant who does will undoubtedly make a favorable impression on the interviewer.

Don't come to an interview without a carefully prepared resume. If writing isn't your forte, get someone to help you, and don't be afraid to spend a few dollars to have one prepared properly. It's probably the most important sales tool you have.

Bring examples of your work with you. These examples are an excellent vehicle for displaying the quality of your work. This is especially true if you are the type of individual who does not communicate well orally.

In some segments of the industry programmers are finding they may have to compete for a limited number of job openings. Often they have no training or experience in this new endeavor.

Elliot Raphaelson, director, systems and programming, for CGA Computer Associates in East Orange, N.J., has some advice for the novice job hunter, based on his experience on the hiring side of the interviewing table.

There are many questions that will probably be asked by an interviewer. Whether they are important is not relevant. You should certainly consider carefully what your response will be to the following common questions:

- What is your salary requirement?
- Do you mind travel? What percent are you willing to accept?
- Do you object to working overtime, occasionally? frequently? without pay?
- Why are you looking for a new job?
- Do you have any professional and character references?
- Why did you choose this profession?

Terminal Installation Advances State's Law Enforcement System

HERSHEY, Pa. – The "Keystone State" has advanced a step closer to its computerized law enforcement system with the installation of 140 terminals.

The units are connected to the twin Univac 494 computers at the state police academy here, and comprise the main communications device in the Commonwealth Law Enforcement Assistance Network (Clean).

The system will replace the teletypewriter network used since 1929, and will improve response from the present half-hour to two-hour period down to less than one minute.

Line checking and training is now being conducted, and the Clean system is scheduled to be tied into the FBI's crime information network late next summer. Clean will also interface with the Pennsylvania Department of Motor Vehicles, and will be used for obtaining statistics on crime, for the state's crime prevention programs.

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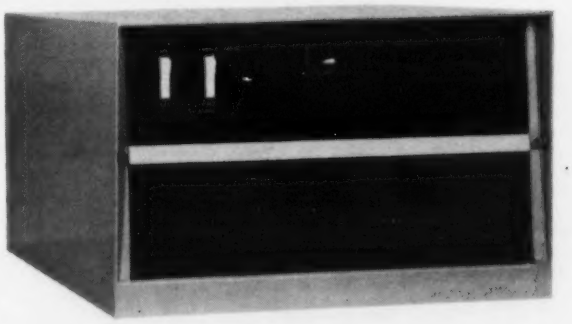

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Study Shows More Profitable Companies Spend Larger Percentage on DP Functions

SAN FRANCISCO – "There is evidence that the more profitable industrial and manufacturing companies spend a larger percentage of their resources on data processing – and spend it differently – than the less profitable corporations," according to a recent study conducted by The Diebold Research Program.

Based on responses from 154 of the country's largest industrial and manufacturing companies, the Diebold Research Program study found:

• A positive correlation exists between DP expenditure patterns and corporate profitability. More profitable companies spend a larger percentage of their resources on the ADP function.

• The more profitable companies spending a larger percentage on ADP functions spend it differently than do the less profitable companies.

• The average DP budget represents about .90% of corporate sales for all industrial and manufacturing companies surveyed.

• The average company surveyed spends $11.2 million per year on data processing; the 154 corporations surveyed spend a total of $1.7 billion per year.

The typical data processing budget consists of: 35%, hardware; 54%, DP staff; and 11%, external services and supplies.

The average industrial company applies this budget: 30% new systems development; 60% continuing applications; and 10% conversion.

The DP function employees in the companies surveyed average 550; total 85,000; and are 1.34% or the work force.

For every dollar spent on hardware, the average industrial company spends about $1.50 on DP staff, or a ratio of .66 hardware expenditures to staff expenditures.

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All Star Baseball Ballots Complete With Nominees

NEW YORK – The ballots for this year's All Star baseball game will again be computerized, will again be sent through the mail and are already at the printer.

The reason for the early announcement of the nominees, according to officials of organized baseball, is the time frame needed for printing of the "porta cards."

The input media are preprinted with the 128 nominees, plus spaces for write-in votes. They will be distributed at ball parks and retail outlets, where fans can obtain them and mail them to the commissioner of baseball any time from two to six weeks before the July 13 game.

The votes will be processed on an IBM 360/30 at a sales promotion house in Minneapolis, and weekly "progress reports" will be issued during the four-week voting period.

Although several programs exist to determine a player's comparative skills and progress in many offensive and defensive situations, these programs were not used for the nomination procedure.

Each manager simply nominated one player for each position, and the top eight for each position will be on the ballot.

VA to Automate Index Card File

WASHINGTON, D.C. – The Veterans Administration has undertaken a program to convert its massive card index and other records to an IBM System 360/65 computer system.

According to Donald E. Johnson, administrator of veterans affairs, by going to data processing the eventual overall savings to the VA are expected to exceed $5 million per year. "But, more importantly," he added, "veterans will receive better service."

The largest project will be conversion during the next 12 months of 56 million of the 96 million records of veterans now filed in several card systems.

After the changeover, all of these records will be available in one computer file, rather than in several different files.

Random Notes

Schedule System Optimizes Staffing to Handle Queues

WARWICK, R.I. – The Teller Scheduling System (TSS) aids in the development of optimum staffing plans for banks or other customer-queuing operations, based on reports of customer activity and user-specified levels of acceptable line length and waiting time.

Developed by Information Sciences, Inc., TSS catalogs field data, timing standards and the results of single location tests for further uses, including consolidated regional staffing schedules. The Fortran IV-based system is available for $5,000 plus installation costs, from 14 Jefferson Blvd., 02888.

Bankcom Offers Fast Turnaround On Commercial Loan Statistics

CHICAGO – Statistical commercial loan reports can be provided bank managers immediately or on an overnight basis, with the on-line Commercialoan Monitor service, according to Bank Computer Network Corp. (Bankcom).

The system costs $350/mo for the first 500 loans, plus $100/mo for equipment rental. The base rate provides four hours of computer connect time each month, from 333 N. Michigan Ave., 60601.

Electrical Engineering Library Expanded on Cyphernet T/S Net

ANN ARBOR, Mich. – Electrical engineers are able to access expanded capabilities through the applications library of the Cyphernet time-sharing network.

The Continuous System Simulator (CSS) has been broadened to include 300 elements, and the output has been made more readable. Microwave circuit analysis and a program, called EEGraph, to provide graphic plotting of most analysis programs, have been added to the library.

A "short circuit analysis" is said to provide building planners with a means of determining adequate cable sizes and circuit layouts. Cyphernet is at 333 Maple Village and the network can be accessed from most places in the Midwest, New York City and Los Angeles.

PDDC Calculates, Draws Die Sets

SOUTH PLAINFIELD, N.J. – Working from user-provided sketches and material specifications, the Progressive Die Design by Computer (PDDC) service from Diecomp Inc. produces the detail and assembly drawings necessary to construct die sets.

Complete design services are available now for flat piece parts, and service for bent and drawn parts will become available shortly. Diecomp Inc. is at 2110 Maple Ave., 07080.

Service Prepares Printer Copy

HARTFORD, Conn. – Companies in southern New England can get jobs prepared for printing faster at less cost with the computer-based typesetting services of Datagraphics Inc.

Working from general manuscript copy, from user-owned and maintained magnetic tapes, or from data bases which it maintains for the user, Datagraphics said that it can prepare camera-ready pages for 80% less than the cost of conventionally prepared pages. The firm is at 945 Asylum Ave., 06260.

Package Uses Plotter

'Mark III' Aids Project Plans, Controls

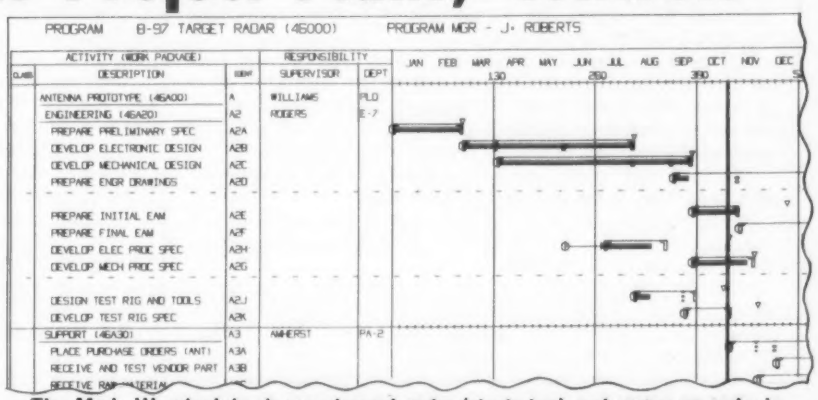
By Don Leavitt
CW Staff Writer

VAN NUYS, Calif. – The Mark III system has been developed by Program Control Corp. to simplify management planning and control of complex, multi-task projects.

Using a digital plotter to generate scheduling/situation charts and resource graphs, the system does not require bubble diagrams or other symbolic preparation to be used. Entries are made using predefined fields on standardized coding sheets.

The bar graph format of the schedules is said to allow project managers and workers to review them without special training. The resource graphs are produced on the same scale as the schedules. If plotted on vellum, they can be directly overlaid so that users can study the interplay of resources and time, the firm said.

Developed originally for construction planning, Mark III can be used for any complex operation involving many closely related and interdependent tasks, especially when the great majority are single occurrence types.



The Mark III schedule shows planned tasks (single bar) and status on tasks in progress (triple bars), in chronological sequence.

The schedule chart shows tasks, by name, in terms of start date, anticipated time needed to complete and, when desired, a "must be completed" point. Progress-to-date is also shown, by task, as is the "as of" date of the chart preparation. These visual guides are coupled with statistical entries that identify the interplay of tasks so users can understand the current situation.

The resource graphs plot the manpower and other materials needed to maintain the schedule. If unacceptable peaks above budget capabilities are generated, management is alerted.

Mark III is operational on the GE 635, CDC 6600, IBM 360 and the Univac 1108. It is available under lease for $1,000 to $1,250/mo depending on configuration. Initial installation costs for in-house use generally run about $5,000, from 7120 Hayvenhurst Ave., 91406.

System Keeps 'Tabs' on Job Mix To Improve DOS Multiprogramming

NEW YORK – IBM 360 users can develop effective job mixes for multiprogramming in a DOS environment with the Time Accounting and Billing System (Tabs) monitoring and reporting software from Datachron Corp.

The monitoring functions require a slight addition to the DOS supervisor which collects data necessary to define characteristics of each job as it is run.

Tabs notes core size and peripherals required. In addition to marking average total run time, the system determines average run time per 1,000 input records. The percent of time that each job is processor bound and the average efficiency are also calculated in the monitoring phase, Datachron said.

Once these chracteristics are established, Tabs produces a daily log of all computer activity and a summary showing distribution of time by function and by user.

Tabs also compares daily performances against averages for each job. It reports jobs whose run times are degraded by the job mix, those that run longer than average time, or those that require a higher percentage of operator intervention than normal.

With the monthly reporting module, the user can call for listings of jobs by any characteristic. This will make it easier to find jobs with complementary requirements, Datachron said, to create a balanced mix for multiprogramming.

Tabs also provides a statistical profile of the jobs run in an installation, so that users can direct their attention to those that use the most computer time or run at the lowest level of operator efficiency.

Tabs is priced at $3,500 for the first CPU and $1,000 for each additional CPU at the same location. The firm is at 174 Fifth Ave., 10010.

Word/One Service Expands To Chicago, Washington

NEW YORK – Bowne Time Sharing Inc. has extended its Word/One text-editing service to Washington, D.C., and Chicago.

The wider coverage will expand the applications being handled by Word/One. Bowne is at 345 Hudson St., 10014.

'Neat' Revises, Resequences 360 Fortran Source Programs

LOWELL, Mass. – Users of Fortran II or Fortran IV on the IBM 360 can correct all statement number references in their source programs, and collect and organize the statements into a standard pattern, with the Neat documentation program from Environmental Computing Inc.

Working with source programs as input, Neat recalculates all statement sequence numbers, and revises internal references in GO TO statements to reflect any changes from previously valid references. The revised statement numbers and program identification can be included in card columns 73 to 80 of a new source deck.

The program will also gather all FORMAT statements at the end of the user's program, regardless of where they were originally. Output of Neat is a revised source deck, or printed list, or both, at the user's option.

Another capability of the package permits the acceptance of cards punched on an IBM 024 or 026 keypunch, and the conversion of codes, as appropriate, to 029 format before punching a new deck.

The package, including Neat source deck, program listing and a manual, costs $500, from 21 George St.

PLC Studies Data Base Language Paper

CRANFORD, N.J. – A working paper describing data base language developments is being distributed to members of the Codasyl Programming Language Committee for review prior to the next PLC meeting in May.

The Data Description Language (DDL) would be "globalized," according to one proposal, so that a wider variety of data types could be described, and the DDL would interface with application languages other than Cobol.

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Intermod Uses Mini for APT

LONG BEACH, Calif. – Parts manufacturers are able to handle APT processing, including three-axis contouring capability and standard APT compatible center-line data, on a minicomputer, with interactive software developed by Intermod.

Implemented on the Honeywell H-316, the package can be adapted to any other 16-bit minicomputer with at least 8K words of memory, the company said. The Intermod APT produces three times the throughput of existing mini-based systems, a spokesman claimed.

The package provides expanded motion, pocket and part surface commands, in addition to full on-line interactive parts program editing capability. Modular in design, the program normally prepares a punched paper tape, but can be easily expanded into direct numerical control, the company said.

The Intermod Interactive APT is described as a comprehensive expansion of the standard APT language.

Although large scale APT systems provide five axis contouring, they often require in excess of 128K bytes of memory to do it, according to the firm.

Intermod claims that its package provides a complete in-house tape preparation system at a cost lower than service bureaus or time-sharing firms can offer. The package costs $12,000 from 215 Euclid Ave., 90813.

Package Uses PDP-10

'Cobrg' Writes Cobol Source Code

MAYNARD, Mass. – Producing source programs from parameters entered in either time-sharing or batch mode, DEC's Cobol Report Generator (Cobrg) system eases coding chores on the PDP-10.

PDP-10 users can get Cobrg from DEC, or it is available as a service on the First Data Corp. time-sharing network, where the package can create source programs to be compiled on any computer with Cobol support.

The program generated by Cobrg includes all the logic required to produce a printed report. While the output is a source program that can be compiled "as is," it can also be expanded with traditional Cobol if more complex coding is needed.

In addition to a Name specification that contains parameters for the Identification, Environment and Data divisions, Cobrg also requires Input and Output specifications to complete the Data division of the generated source program.

The input can be read from any device which must be defined unless it is disk. The output can also be placed on any device, with disk as the default option. DEC explained that disk is the usual medium because the PDP-10 is primarily a time-sharing machine and I/O is generally spooled for efficiency.

Other specifications allow the user to define up to 25 fields to be tested for control breaks, to specify which fields are to be accumulated, and which totals are to be printed.

With the Break specification, nine priorities of control level can be identified, DEC said.

Specifications for several programs can be stacked, according to the company, since each set must begin with a Name specification. After the source programs have been generated, they must be compiled before they can produce the desired results. Cobrg is not a 'load-and-go' report generator, a spokesman noted. First Data Corp. is at 400 Totten Pond Road, Waltham, Mass. 02154.

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***For those who missed the October 14, November 25, December 2 and January 27th issues of Computerworld , AMIGOS ("friend" in Spanish) is the data processing industry's most powerful file access method which will completely replace ISAM on the S/360.**

CACI Puts Simscript On Extra Processors

SANTA MONICA, Calif. – New versions of the Simscript I.5 general simulation language compiler emphasize the transferability of the language between systems. All are source language compatible, according to the developer, Consolidated Analysis Centers Inc. (CACI).

The versions have been implemented on CDC 6000 Series, IBM 360/40 and above, NCR Century 200 and Univac 1100 series. Earlier, Simscript I.5 was available for CDC 3000, IBM 7090/94, and RCA Spectra 70, as well as the Philco 200 line.

The latest I.5 versions are said to cut the cost of both Simscript compilations and executions by approximately 75%. Automatic error checking has been built in and diagnostic messages have been expanded.

With the exception of the Univac 1100 implementation, which is available directly from Univac, all the Simscript I.5 compilers are available as packages for in-house use from CACI.

The CDC 6000 version is also available, as a service, through the CDC Data Centers, for 20% above standard rates, according to CDC spokesmen. CACI is at 225 Santa Monica Blvd., 90401.

Utility Service Can Speed User Access

MIAMI – Users in this area can access an IBM 360/65 operating under OS/MVT, without the problems associated with normal installation and operation, through the "computer utility" service available from Proprietary Systems Corp. (PSC).

Access to the PSC computer is through a Remote Job Entry system which supports intelligent terminals, or small scale computers, as "utility work stations" on the user's premises. IBM 1130s, S/3s, or 360/20s are among the CPUs that can be used as work stations under this plan, PSC said.

The utility provides full time access, seven days a week, to the main computer. Users are on-line via a high-speed leased telephone line. To insure security of data, PSC has a multi-level passkey and password protection for programs, data files and terminals.

One further level of security is possible as well. PSC said that if the user wished, cryptographic data transmission protection facilities are available.

PSC bills for the use of the computer utility on the basis of 50K blocks of core, up to a maximum of 500K bytes; and CPU time. Charges are also made for number of cards read, cards punched and lines printed at the user's work station. Proprietary Systems Corp. is at 999 South Bayshore Drive.

Bits & Pieces

Images Stored on Disks Speed Microfilm Retrieval

SUNNYVALE, Calif. – A minicomputer-controlled system which combines video recording and computer disk techniques to find and display microfilm document images in less than 70 msec was announced by CMX Systems Inc.

The CMX Editor interfaces with master microfilm or videotape storage systems and features a refresh memory capability allowing simultaneous access to the same documents by many CRT units.

In addition to the PDP-8 mini, the system consists of a control console and from one to 12 disk drives. A special version of the 20-surface IBM 2316-type disk pack with chromium oxide recording surface is used.

The price of the CMX Editor will be in the neighborhood of $250,000. The microfilm retrieval system would be lower, CMX said. The first unit will be delivered in April from 635 Vacqueros Ave., 94086.

Univac Module Replaces Modems For Use at Limited Distances

BLUE BELL, Pa. – Designed for limited distance applications, the Univac 8543 Direct Connection Module can replace modems for the attachment of various communications terminals and processors at speeds up to 9,600 bit/sec and distances to 15,000 ft.

The RS 232 compatible module can be used for multidrop or point-to-point systems in facilities such as factories, airports warehouses, etc. The unit can be purchased for $600 or rented for $25/mo on a one-year lease. Deliveries are scheduled to begin in early summer.

Terminal Gains Graphics, Low-Cost Option Handles Charts

HAUPPAUGE, N.Y. – Applied Digital Data Systems announced graphics capability as an option on its Consul Series of CRT terminals with the additional price of $195. With this feature users will be able to display bar charts, tables, plotted data and other graphic representations of information previously restricted to alphanumerics. The firm is at 100 Marcus Blvd.

Compact Air Conditioners Offer Precision Control for DP Rooms

COLUMBUS,Ohio – Compact three- and five-ton airconditioning units specifically designed for computer room use by the Liebert Corp. allow control of cooling, heating, and dehumidification. Available in both vertical and downflow models, the units are available with water cooled, air cooled, chilled water or glycol condensing systems. Price for a three-ton unit is about $4,400, while the five-ton model sells for about $5,000 on a 30-day delivery schedule from 6700 Huntley Road, 43229.

Viewer Can Double as Light Box

WORCESTER, Mass. – A motorized, back-lighted chart viewer, Chartview from the MSI Division of O.S. Walker, is designed to display charts between 1 in. and 12 in. width. Speed is variable allowing a 100-ft chart to be rewound in about one minute. The device can also be used as a lightbox for film viewing or tracing. The viewer panel measures 12 in. by 16 in. Priced at $265, the unit is available on a 30-day free trial basis from Rockdale St.

Connect to I/O Bus

Nova Peripherals Offered by Decision

By Frank Piasta
CW Staff Writer

OAKLAND, Calif. – A line of peripherals, from Decision Inc. is available to users of the Data General Nova and Supernova minis.

Called the System 31, the peripherals include a removable-cartridge disk, 7/9-track magnetic tape drives, paper-tape reader/punch, electrostatic or impact line printers, medium-speed card reader, analog/digital and digital/analog converters and a graphic CRT system.

The devices include controllers which connect to the computer via the external I/O bus connector. Each 3-1/2 in. controller cabinet can accommodate a combination of peripherals.

All peripheral configurations are supported by software including Decision's Disk Operation System (DDOS), said to be the most sophisticated DOS available from a non-computer manufacturer for the mini user.

The Model 3150 Disk System includes a 3150 controller and a moving-head disk with a capacity of 1.44 million 16-bit words on each cartridge. The word transfer rate is 100 Khz.

Overlap seeking and multiple sector transfer are standard, allowing full disk read and write with one command. Each controller can operate as many as four drives for an on-line capacity of 11.5 million characters, the firm said.

The Model 3120 controller can handle as many as four Model 3112 magnetic tape drives. Bit density is 556 or 800 bit/in., in 7- or 9-track configurations, with a direct memory access rate of 30 Kchar/sec.

Available options include Automatic Store and Load which allows the computer memory's contents to be stored on, or recalled from, tape by using front-panel controls.

Printing at the rate of 300 line/min, with 80 character/line, is available with the electrostatic printer. The impact line printer is rated at 135, 132-character line/min.

The card reader is a desk-top unit that can handle 300 card/min. Either fan-fold or roll paper tapes can be read at 650 char/sec and punched at 110 char/sec with the Paper Tape Reader/Punch.

The Graphics CRT system includes a storage scope plus alphanumeric and vector-drawing software. A/D-D/A converters are built to the customer's requirements.

The DDOS software features device independence and full compatibility with Data General software. Users with suitable hardware can operate in all Data General higher level languages, such as Fortran, Algol and Basic, the firm said.

The prices, including controllers and software are as follows: disk system, with one drive, $10,000; magnetic tape system with one drive, $8,800; electrostatic printer, $9,000; impact printer, $8,300; card reader, $3,200; paper tape system, $4,400; and graphics CRT, $6,700.

Delivery, depending on configuration and customer requirements, is 60 to 90 days from 5601 College Ave., 94618.

Selectric-Based Teletypewriter Uses PDP-8 Terminal Software

POMPTON LAKES, N.J. – The PDP-8 user who wants a fast, quiet, on-line teletypewriter with upper and lower case capability can use the Tycom 35/37 Ascii-CSR from Terminal Equipment Corp.

The Tycom unit consists of an IBM model 723 or 725 Selectric typewriter equipped with Tycom equipment to allow operation on the external bus of the PDP/8. The control unit, developed to fit into a logic channel of the CPU, provides I/O buffering and code conversion.

The terminal is said by the manufacturer to be completely hardware and software compatible with the mini.

The terminal can be operated at 15.0 char/sec and has a 92-character set with full upper and lower case and a 130-character carriage. A choice of 27 font elements, including OCR, are available.

The price of the Tycom 35/37 Ascii CSR is $2,975. The paper tape punching equipment, or the magnetic tape cassette system will add $1,300 to the cost. Communications interface, with modem or coupler, is priced at $300. The terminal is available on a 30- to 90-day delivery schedule from 750 Hamburg Turnpike, 07442.

Sketchprep Automates Draftings

WALTHAM, Mass. – An automated drafting system designed for users with ten or more draftsmen, the Sketchprep from Dimensional Systems is a turnkey system that produces ink-on-vellum drawings from rough engineering sketches in two models.

The smaller configuration which can service as many as eight digitizer stations uses a DEC PDP-8 with 8K core memory. The digitizer includes a nixie-type display and a paper tape punch to supply input to a plotter. The cost of the system is $50,000 and it is available in 60 days.

The larger system is a completely automatic drafting system based on a DEC 16K PDP-15. As many as four digitizers can store data on a disk file for previewing and editing on a graphics terminal. The output of the terminal is transferred to a plotter, under control of the minicomputer. Actual plotting can be done after hours, the company said. Price of the system is $200,000 and it will be ready for delivery in August from 393 Totten Pond Rd.

Philips P-350 Series Enhanced, Mag Card Capacity Increased

NEW YORK – Philips Business Systems, Inc. has added another model to its P-350 Series of magnetic ledger card business-oriented minicomputers, the P-359 with larger capacity magnetic ledger cards and a wider 30-in. split platen to accommodate larger forms.

The system is designed to be used in small businesses for the processing of invoices, accounts receivable, payroll, inventory control, general ledger and related reports.

Software packages for various industries can be provided by Philips. These include packages for automobile dealers, fuel oil distributors, medical clinics, and savings and loan

The console printer has two mutually independent pin-feeds for handling two different sets of continuous forms. It can print at 23-1/2 char/sec. Other peripherals available include a 300 card/min reader, 50 col/sec punch, and 50 char/sec paper tape reader/punch.

The magnetic ledger card used in the system has been increased in capacity from 256 digits to 672 digits,

The price of the 800-word memory system is $460/mo or $22,990. The 1,200 word CPU will lease for $530/mo and sell for $26,490. Software costs are not included. The systems are available on a 90-day delivery schedule from 100 E. 42nd St., 10017.

Marshall M2800 Capacity Clarified

The capacity of the Marshall Dual Density Direct Access System [CW, April 14] is 466 Mbytes. The M2800 has two controller addresses each of which can support the equivalent of an IBM 2314 maximum configuration for the total M2900 system capacity.

IMS/360 USERS

Nortel International, Inc., a professional organization specializing in data base management, announces the availability of Query Language/One.

QL/I is the package that gives IBM IMS/360 users on-line, English language, data base query capability. QL/I provides management and operational information faster and at lower cost, and eliminates the need for additional applications programming.

Query us.

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Beverly Hills, California 90211
(213) 653-6723

NORTEL

Card-Oriented PDP-15 Bows

MAYNARD, Mass. – Users that frequently encounter scientific problems not large enough for a general-purpose computer may be interested in a recently announced card configuration of the DEC PDP-15.

Featuring large storage capacity, high computation speed, and programming flexibility, the PDP-15/50 is intended for use by college computation centers and industrial and government users.

The floating-point processor, which DEC said enables arithmetic operations to be completed 10 times faster than by software, allows more jobs to be completed in a given time. Disk operating software offers users program protection via a "log in" feature.

The system batch operating software is unique in that it uses none of the rigid command structure normally associated with these systems, according to DEC.

The price of $149,400 includes 16K 18-bit words, 1,000 card/min reader, 300 line/min printer, teleprinter, tape drive and controller to handle half-inch tape in IBM-compatible format, floating point hardware, 10 Mword disk pack drive and controller, paper tape reader and punch, real-time clock and extended arithmetic element for integer arithmetic and logical shifts. The price on a five-year pay-out lease is $3,900/mo. First deliveries will be made this summer.

Keyboard, Joystick Input

CRT Has Split Screen Feature

By Frank Piasta
CW Staff Writer

BEAVERTON, Ore. – The Tektronix 4002A interactive graphic and alphanumeric CRT terminal is equipped with a split screen that includes both storage and refreshed displays.

Intended for use with several minicomputers, the terminal keyboard has all 128 Ascii characters and a plug-in port which accepts interactive graphic units using the Tektronix Joystick and other analog or data acquisition devices.

The main portion of the split screen can display 39 lines of 85 italic or vertical characters. Any point on a 1,024 by 1,024 coordinate matrix can be addressed in three different graphic modes, and any point on a 761 by 1,024 coordinate matrix can be viewed.

The scratch pad portion allows a computer to address the 4002A without disturbing data stored on the main portion of the CRT. It also allows the composition and editing of data before transfer to the main display.

Software packages supporting the 4002A include Fortran, Assembly Language, and the Tektronix graphics software/360 system.

The 4002A may be interfaced with data communication systems, dedicated computers and computers with Teletype ports. A data communications interface allows the unit to operate with systems which transfer data serially in either full-duplex or half-duplex mode and conforms to EIA standard RS-232C. Transmit and receive rates are independent of each other and switch selectable from 100 to 9,600 bit/sec, Tektronix said.

The terminal is compatible with the Tektronix 4601 hardcopy unit.

The price of the 4002A is $8,800 without interfaces which range from $600 to $750. First shipments will be made in the third quarter of 1971. Tektronix can be reached through P.O. Box 500, 97005.

PRO/TEST
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FILE CONVERSION/ CORRECTION UTILITY

USERS create new files, correct and reformat existing files simply and rapidly. *Any existing file can be used as the basis for creating another file which is different in format, organization and storage media.* Records can be deleted, inserted, reformatted, exploded or summarized. Fields can be packed, unpacked, converted to binary or translated based on user criteria. Totals can be developed to control the conversion effort.

FILE STRIPPER

USERS select data from live files based on record number, keys, accumulations, calculations or other specified criteria. *Selected live data can be combined with generated data.* The volume of data selected from a large live file can be limited and selection criteria can be altered during processing. Selected data can be the basis for a completely unique output file.

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USERS implement reliable systems in less time because they generate comprehensive data from simple, concise specifications, then test their programs in any order. Any file can be generated at any time to support implementation, maintenance and auditing efforts. PRO/TEST reports improve project control and document the test cycle. Segmented file structures can be generated to test *IMS applications* and files can be generated *on-line.*

GENERALIZED INPUT EDITOR

USERS eliminate the need to write and test special programs to edit input data. Fields can be edited for specific criteria, logical relationships, sequence, a variety of data conditions, as well as tested for leading zeroes and spaces. *Data can be verified or translated based on user supplied tables.* Input records can be listed, deleted, printed in a report, or used as the basis for a new output file. Control totals can be verified or developed.

GENERALIZED REPORT WRITER

USERS respond to management information needs in hours rather than days. Virtually any report can be created based on selected or complete data from any input file. Report fields can be calculated, cross-footed, summarized, totaled and edited using standard conventions – floating dollar sign, zero suppression, etc. *Reports can be created as a single function or in combination with file conversion, input editing, etc.*

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Bits & Pieces

TRW 3000 Provides Banks With Low-Cost Authorizer

REDONDO BEACH, Calif. – The TRW System 3000, a point-of-sale credit authorization system, has been adapted to provide bank tellers with authorization for check cashing and savings withdrawal transactions.

The pilot installation, servicing five banks plus a credit card service in the Chicago area, provides a response time averaging 1-1/2 seconds to notify the teller at any one of 90 terminals about how the transaction should be handled.

The rental price of the system, including processor, disk storage, modems, terminals, etc. is about $3,000/mo on a five-year lease.

Automatic Punched Tape System Handles 11,200 char/min Output

COLLEGE POINT, N.Y. – An automatic punched paper tape handling system, consisting of the UCM-200 motorized centerfeed unwinder and DWM-1A motorized take-up, is designed by the Data Products Division of Robins Industries Corp. to be used with Mohawk, NCR, and similar units that read tape at 11,200 char/min.

The centerfeed unit has an automatic stop-start-go feature that permits unattended operation. The centerfeed saves time by eliminating the need to rewind tape before it is read. The system can take up to 12 in. reels of tape. It is available at a cost of $415 on a three- to four-week delivery schedule from 15-58 127th St., 11356.

Point-of-Sale Printer Offered

PLAINVIEW, N.Y. – A printer designed to be used in point-of-sale credit verification systems, the 888 Printer from Computer Terminal Systems, Inc., can accept standard types of credit vouchers and authorizations used by banks and major retailers. The printer will be priced between $200 and $500 and will be available from 52 Newtown Plaza.

Tape Storage Systems Saves Space

WOODSIDE, N.Y. – The Live Aisle Mobile Storage System can store a user's magnetic tape files in 43% less space by eliminating access aisles. A recent installation, the company said, stores nearly 5,000 reels in an 8 ft by 17 ft area.

The racks on mobile bases, glide on steel rails. Priced at about $200 for a six-shelf rack, the units are available from 39-27 59th St., 11377.

• New Tape Cassette Unit adds versatility to our teleprinter.

We can now furnish a magnetic tape unit for your General Electric TermiNet* 300 Teleprinter to add fully automatic send and receive capability.

Designed as an alternative to the paper tape reader/punch option presently being supplied, the new accessory, uses standard cassettes and plugs into any TermiNet 300 Teleprinter.

The small compact desk top unit can read, write, rewind or stop with no operator present.

High speed tape transfer rates up to 1200 bps can be obtained.

Additional advantages include compact data storage, reusable tapes, and simplified editing. You can advance or reverse the tape a character at a time with local or remote controls.

This is but one of 18 available options which make the TermiNet 300 Teleprinter one of the most versatile teleprinters on today's market.

For a demonstration, contact your nearest GE Data Networks sales office. They're listed below.

Or give us a call; Dial 703-942-8161 and ask for TermiNet 300 Printer Sales
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P. O. Box 4197, Lynchburg, Virginia 24502.

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Switched Network Provides Data Backup

By Don Leavitt
CW Staff Writer

NEW YORK – Private line data users here are overcoming frequent line outages by using alternate dial-up facilities.

Although the affected users operate large systems which must continue to operate, the methods can be applied to all private line systems to provide low cost backup.

One of the users has a CDC 3300 as a communication front-end processor in his main office. Status reports, including line outages, are reported on a supervisory teletypewriter.

The affected remote station is notified and as a stop-gap measure data is moved verbally on the dial-up net while a technician works on the problem line.

If the outage lasts an hour, a remote station operator flips a toggle switch, and dials a special number to the central office. The data link is then reestablished through a hardwired coupler and manual Data Access Arrangement into the Bell system.

The data is received at the central office through other hardwired couplers. The system adds a "pseudo private line code" and data continues to move as it did on the private line.

While the first user chose hardwired couplers, to be sure that his transmissions wouldn't suffer from outside vibrations and noise, another user provides backup with acoustic couplers, because of their lower cost and greater flexibility.

This user has dual private lines available for output to the remote stations, so his need for backup is somewhat less. But the use of acoustic couplers means he has protection against a line failure on the switched net, as well as a way around a private line outage, he said.

If one phone line or handset in his office is out, he can use any other that is available.

Both users adapt the messages coming from the switched network so that the nonprivate line origin is transparent to the computer system.

Communications

Acoustic Coupled Modems Are Bell 103 Compatible

LIVERMORE, Calif. – All units of the 71 Series of acoustically coupled data sets and modems, available from Livermore Data Systems Inc., are Bell 103 compatible, and permit transmission of serial binary data at speeds up to 300 bit/sec.

The Model 71B provides EIA RS232 interface, and handles both full and half duplex operation. Prices start at $235, from 2050 Research Drive, 94550.

Meet the grand old man of off-shore keypunching.

Cindy Luk is one of our best keypunch operators. She was with us when we pioneered in off-shore keypunching, and she's still with us.

That was a year and a half ago. But so much has happened in the off-shore keypunching field since we began that Cindy is a real old-timer.

So are we.

And so are the rest of the highly educated, English-speaking operators in our Hong Kong keypunch center.

That's why we've been able to handle jobs for major U.S. clients of all sizes, from world-wide banks to retail chain stores, tire companies to international charities, both directly and through service bureaus.

Because our keypunch operators come from one of the most efficient and best-educated work forces in Asia. They average more than 12 years of education in English-speaking schools. And they're all selected and trained through IBM tests and programs.

In the past year, our keystroke capacity has grown to the size of the largest American installations.

We've cut our turnaround time and our costs. We'll keypunch cards for half the U.S. price or less, with a 10-day turnaround time.

But our biggest asset is still Cindy and the rest of our smart, careful girls. Because they let us guarantee 99.8% accuracy . . . a guarantee that most off-shore companies can't make. And that quality is the same whether the size of the job is 5,000 cards or a million.

Our nation-wide sales organization picks up and delivers at your offices. That makes dealing with us just like dealing with somebody next door . . . no confusion or extra work for you.

Call or write us for more information or quotes. And watch for more new services we're going to be offering in the next few months. They'll be at a technological level that may startle you.

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Right, Cindy?

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China Data Systems Corporation is now offering typing services for optical scanning input. Call our nearest office for further detailed information.

Data Briefs

Terminal Includes Speaker For Audio Response Use

SAN DIEGO, Calif. – A 12-key Touch Tone-style terminal with a built-in speaker, the Model T510 has been developed by Wavetek Data Communications as a low-cost means of accessing a computer-based audio response system.

Leasing for as little as $7/mo, the T510 operates on voice-grade private or switched network telephone lines. It can be attached to the switched net through either an acoustic coupler or a Bell System Data Access Arrangement and can be carried in a brief case.

The unit sells for $300, from 9045 Balboa Ave.. 92112.

Acoustically Coupled Terminal Weighs 28 lbs, Prints Ascii

PROVIDENCE, R.I. – The Compudata terminal offers remote acoustically coupled operation with alphanumeric I/O, and multi-copy printout, and weighs 28 lbs.

The keyboard generates Ascii characters in transmit mode, and the impact printer handles the full 64 character Ascii subset. Standard features include automatic carriage return and line feed, parity check for transmission errors and half- and full-duplex operation. Transmission rate is 10 char/sec with 15 char/sec available as an option. The price of the terminal is $1,999. It is available on a 36-month lease at $69/mo. The unit is available in 60 days from 100 Manton Ave., 02909.

Digital Data at 1,200 bit/sec Handled by Tele-Dynamics

FORT WASHINGTON, Pa. – Receive time recovery and eight full-duplex FSK channels for sending and receiving digital data at rates up to 1,200 bit/sec are among the features of the 7260 Data Transmission System available from Tele-Dynamics Division, Ambac Industries.

The 7260 is designed for frequency-division multiplexing with time-sharing CPUs, the company said. Cost can be as low as $600 per full duplex channel, from 525 Virginia Drive, 19034.

Instruments Interface With Mux

LINCOLNWOOD, Ill. – Input and output options available for the Dijitscan 2000 multiplexer can satisfy most instrumentation and recording requirements, according to Pivan Data Systems Inc.

The unit accepts multiple BCD inputs and provides them sequentially at the output. It accommodates 10 BCD digits and is expandable in increments of five digits. The Dijitscan 2000 can interface with voltmeters, counters, paper tape performators, Model 33 ASR teletypewriters or magnetic tape units. The multiplexer costs $420, from 6955 N. Hamlin Ave., 60645.

'Vodas' Links Mixed Networks

FRANKLIN PARK, Ill. – Users with multi-location data and voice networks can ease accessing of remote points with Voice/Data Switching (Vodas) equipment, available from Comtech Corp.

Designed to operate over any leased voice-frequency channel, Vodas allows the interconnection of standard four-wire data terminals on demand. Phone stations can also be linked automatically through Vodas.

The basic Vodas switch supports 50 lines and costs $15,000. Terminal Distribution Units, which are required for multiplexer stations, cost $5,000 to $10,000 each, from 11411 Addison St.

CAI Comes to Appalachia

ASHLAND, Ky. – Almost 2,000 Appalachian-area elementary and high school students are gaining the benefits of a CAI program similar to those now operating in such metropolitan areas as Cincinnati and New York City.

The Eastern Kentucky Educational Development Corp. recently dedicated the RCA computer installation.

A total of 34 teletypewriter terminals are located in 26 semirural and rural public and parochial schools, the Kentucky School for the Deaf and the Federal Youth Center, a correctional institution for boys.

All 34 terminals are linked by telephone lines to a Spectra 70/45 and a 1600 computer, both of which are housed at the Holy Family Catholic School here.

According to EKEDC Director Edwin R. Jones, the CAI program used here is similar to those in Cincinnati and New York City.

He added, however, that this is probably the first time the program has been attempted in an area where participating schools are so widely scattered.

Most of the schools are anywhere from 50 to 200 miles away from the EKEDC computer center, with some of them being in such remote areas that telephone lines had to be installed before the terminals could be connected.

"The use of computer assisted instruction in the school room serves to assist, enrich and supplement regular instructional programs. And in Appalachia specifically, the introduction of such technology is helping to close the gap between the frontiers of educational research and isolated rural schools," Jones stated.

Each terminal can accommodate approximately 60 students per day and offers an individualized "give and take" relationship with every child.

During a lesson problems presented by the computer are typed out on the terminal and the student responds by typing the solution in a blank adjacent to the question. If more than 10 seconds' response time elapses, the computer prints on the teletypewriter "time is up" and indicates the answer. The computer responds to an incorrect answer. The computer responds to an incorrect answer by typing "no, try again," and if the student again fails to answer the question correctly, the computer indicates the correct answer.

"This ability of a student to progress at his own pace toward mastery of a subject is what makes CAI so important," said Jones.

"By individualizing instruction according to a child's level of ability, it provides the motivation needed by so many of our socially disadvantaged to compete in a world for which they are otherwise so poorly prepared."

Jones explained that since CAI enables each student to learn at a rate best suited to his individual achievement level, lessons presented on the teletypewriter vary with each child.

The computer prints the date, the number of problems correct, the percent correct, the time spent on the exercise and the cumulative score for all lessons taken.

Besides CAI, the computer installation also will be used to process such school district administrative data as student schedules, grade reports and teacher payrolls.

Canadian Students Buoyed by Computer

DELHI, Ontario – Students at Delhi District Secondary School are gaining a big advantage over other DP students when they move into colleges or the business world by acquiring "hands on" experience with a computer.

An IBM Call 360 computer was installed at the school last fall and is helping students in such courses as information processing, basic programming, and computer systems and design.

Maynard Moore, DP instructor at the school, said the availability of the system has provided a tremendous "lift" to the students.

School's Data Center Set for Updating

DECATUR, Ill. – The first steps have been taken in the long process of updating the Decatur public schools' DP equipment and educating those who may use it in the future.

In-service training sessions have been scheduled to explain to the school district staff the educational possibilities of data processing. According to Larry Bechtel, most people, including teachers, administrators and board of education members, don't understand much about data processing.

COMPUTERWORLD

education

Executives Go Back to School

POUGHKEEPSIE, N.Y. – A school on computer techniques, offered by IBM, is helping top executives feel that life in a corporate suite is really worth living.

The five-day customer course is constructed around a simulated business problem. The problem is attacked by the entire class of executives, broken down into teams of three or four men, each with an IBM instructor to guide them through the intricacies of on-line techniques.

Most of the students in this particular course, which is only one of a number aimed at top management, already have major computer installations. Their level of understanding of computers varies considerably, and one of the reasons they're here, according to IBM, is to learn to talk to their DP specialists back in the home office.

"We introduce them to the concept that the computer is a logical extension of the executive in decision-making and planning," said William R. Jones, IBM's manager of customer programs.

The executives come from a variety of corporate, nonprofit and governmental organizations

Credit cards are no problem...

but the processing of the invoices can sure drive you crazy.

Fifty million Americans. That's how many have all-purpose credit cards. Sure, it's easy for them to go around using a walletful of cards. But it's tough if you're the one who has to process the hard-copy invoices.

That's where our Model 700 optical scanner/encoder comes in. It automatically reads and MICR encodes 4,000 credit card invoices an hour without computer assistance. Replaces 8 manual operators and their MICR encoders. Eliminates human error. Processes even badly smudged invoice cards. And saves you $ in costs over conventional processing means.

Why not beat the high cost of keypunching and manual encoding, speed your throughput, and get a little extra elbow room with our compact Model 700? It's the answer to your paper blizzard.

For more details, call or write: DATA RECOGNITION CORPORATION, 908 Industrial Avenue, Palo Alto, California 94303. Telephone (415) 326-4810.

DATA RECOGNITION CORPORATION

COMPUTERWORLD

societies

Communication Group to Convene

NEW YORK – The services proposed by computer-communications companies such as MCI, Datran, and AT&T will come under the microscope at the first National Meeting of the Communications Systems Management Association (CSMA).

Scheduled for the Statler Hilton Hotel here May 21, the theme of the meeting is "The analog vs. digital communications networks and the problem of interconnection."

Other topics will include the association's plans for certification of communications professionals and the new programs and benefits that CSMA will offer to its members.

Speakers will represent a major cross sectional image of companies involved in communications' networks' interconnection, according to an association spokesman.

John Goeken, president of MCI, David Gourley, vice-president for marketing at Datran, Jon Gould, director of data communications for Interdata, are among the speakers.

Nonmembers of the year-old association are invited to attend, and an official stated attendance would be by advance registration only. Information from Box 2805, Wilmington, Del., 19805.

Calendar

May 2-5, Miami – Association of Business Forms Manufacturers Annual Meeting. Contact: ABFM, P.O. Box 5737, Washington, D.C. 20014.

May 3-5, Dallas – Sixteenth Annual College and University Machine Records Conference. Contact: Dr. Michael O'Hagen, Director, Southern Methodist University, Dallas, Texas.

May 4-6, Philadelphia – 1971 SID International Symposium and Exhibition sponsored by the Society for Information Display. Contact: Thomas C. Maloney, Burroughs Corp., P.O. Box 1226, Plainfield, N.J. 07061.

May 6-7, Philadelphia – Eighth Annual National Information Retrieval Colloquium. Contact: Louise Schultz, Anirc, Boisis, 2100 Arch St., Philadelphia, Pa. 19103.

May 7, Newton, Mass. – 1971 New England Systems Seminar sponsored by the Boston area chapters of the Association for Systems Management. Contact: ASM, P.O. Box 1283, Boston, Mass. 02104.

May 10-12, Las Vegas, Nevada – 17th National ISA Aerospace Division Instrumentation Symposium. Contact: John F. Piccolo, general chairman, EG&G, Inc., Las Vegas, Nevada.

May 12-14, St. Louis, Mo. – Conference on the Use of EDP in Regulation sponsored by the Missouri Public Service Commission. Contact: A.S. Forsythe, director of public information, Missouri Public Service Commission, Jefferson City, Missouri 65101.

May 12-14, Boston, Mass. – 1971: 22d Annual Conference of the American Institute of Industrial Engineers. Contact: Anthony J. Janneti, exhibit manager, c/o Charles B. Slack, Inc., Pitman, N.J. 08071.

May 18-20, Atlantic City, N.J. – Spring Joint Computer Conference. Contact: Afips, 210 Summit Ave., Montvale, N.J. 07645.

Microfilm Meetings

Recession Spawns Cost-Saving Interest

WASHINGTON, D.C. – The economic cloud notwithstanding, some computer-type trade shows will show increased attendance and exhibitor participation this year.

One such show is the National Microfilm Convention, scheduled for the Sheraton Park Hotel here May 25-28, with 14,000 people expected.

There will be 26 seminars covering a wide range of interests in the Micrographics field, plus formal papers on such subjects as COM cameras, COM marketing, retrieval, and a proposal to microfiche all volumes in the library of Congress.

Convention General Chairman John R. Robertson, of Eastman Kodak, is slated to assume the presidency of the National Microfilm Association, sponsor of the event. He said it is not difficult to reconcile the prospect of the most successful convention and product exposition in NMA's history with the difficulties of the economy.

"The continued growth of the NMA convention is a direct reflection of the urgent need of many businessmen and institutions to reduce costs," noted Robertson.

Advance registration for the convention is running at twice last year's pace, Robertson reported, and the number of exhibitors' stands at 110, plus "user" exhibitors; the number represents a 17% increase over last year's show, with exhibit area increasing by a third.

More information is available from NMA at Suite 1101, 8728 Colesville Road, Silver Spring, Md., 20910.

Benefits, Limitations

SAN FRANCISCO – The benefits and limitations of COM, plus reviews and analyses of COM hardware and systems will be discussed at a two-day seminar to be conducted here next month by the National Microfilm Association.

The meeting will be May 12-13, in conjunction with a Microfilm Information Systems seminar.

Too many times, intelligent, rational companies lose their shirts in their computers.

They buy a logic system to help save them money. But by the time they finally get the system installed, they find they don't have any money to save.

Well, if it's any help to you, we can save you a few bucks on your memory system. Or to put it more precisely, a few thousand bucks on your next direct access storage facility.

With our new Bryant 2200.

It's plug to plug compatible with the IBM 2314 and 2319. So you can just wheel it right up to your IBM 360—and start thinking.

It comes in the same module configurations as the 2314. A controller and a single drive unit. Or a controller hooked up with from one to four dual drive units, with a single drive unit as a spare.

And if you need service, you get it. In less than two hours.

And it goes, like we said, for peanuts. Thousands of dollars less than the 2314.

If, of course, the 2200's lease price and memory capability are a little more than what you had in mind, we have a smaller model. The 1100, which is identical to the IBM 2311.

It's every bit as good as the 2200. You just don't pay for more memory than you can use.

If you'd like to get a look at our entire peanuts gallery, remember to get a hold of a Bryant representative and ask him to show you our entire line of memory systems. Or write to 850 Ladd Road, Walled Lake, Michigan 48088.

The new Bryant 2200. A fantastic Disc Drive that goes for peanuts.

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COMPUTERWORLD

1971 Output Supplement

April 28, 1971

Output Efficiency - Is it Still In the Dark Ages?

Recent developments in output devices have helped the user speed up that part of his data processing operation that has lagged most in the evolution of computer systems.

The limitations inherent in mechanical devices have proved more difficult barriers to overcome in the search for speed than have electronic problems. Internal CPU speeds have increased from the millisecond range to the nanosecond range, a gain on the order of millions of times.

Typical printer speeds, however, have improved their performance well under 100 times, while other output units have been even slower to improve.

Different approaches are being taken that will help prevent the computer from choking on its own output. A growing trend is re-emerging from the first generation – the use of impact printers independently of the CPU, either through elaborate buffering systems attached to the main computing facility, or completely independent units that function only as printers.

A second approach, being taken largely by independent manufacturers, involves eliminating the impact mechanism. These non-impact units, using a variety of techniques, can produce printed matter at rates significantly higher than those attainable by impact units.

The lower initial cost of the nonimpact devices can also be used to increase printed output by making multiple printer installations feasible at little increase in cost.

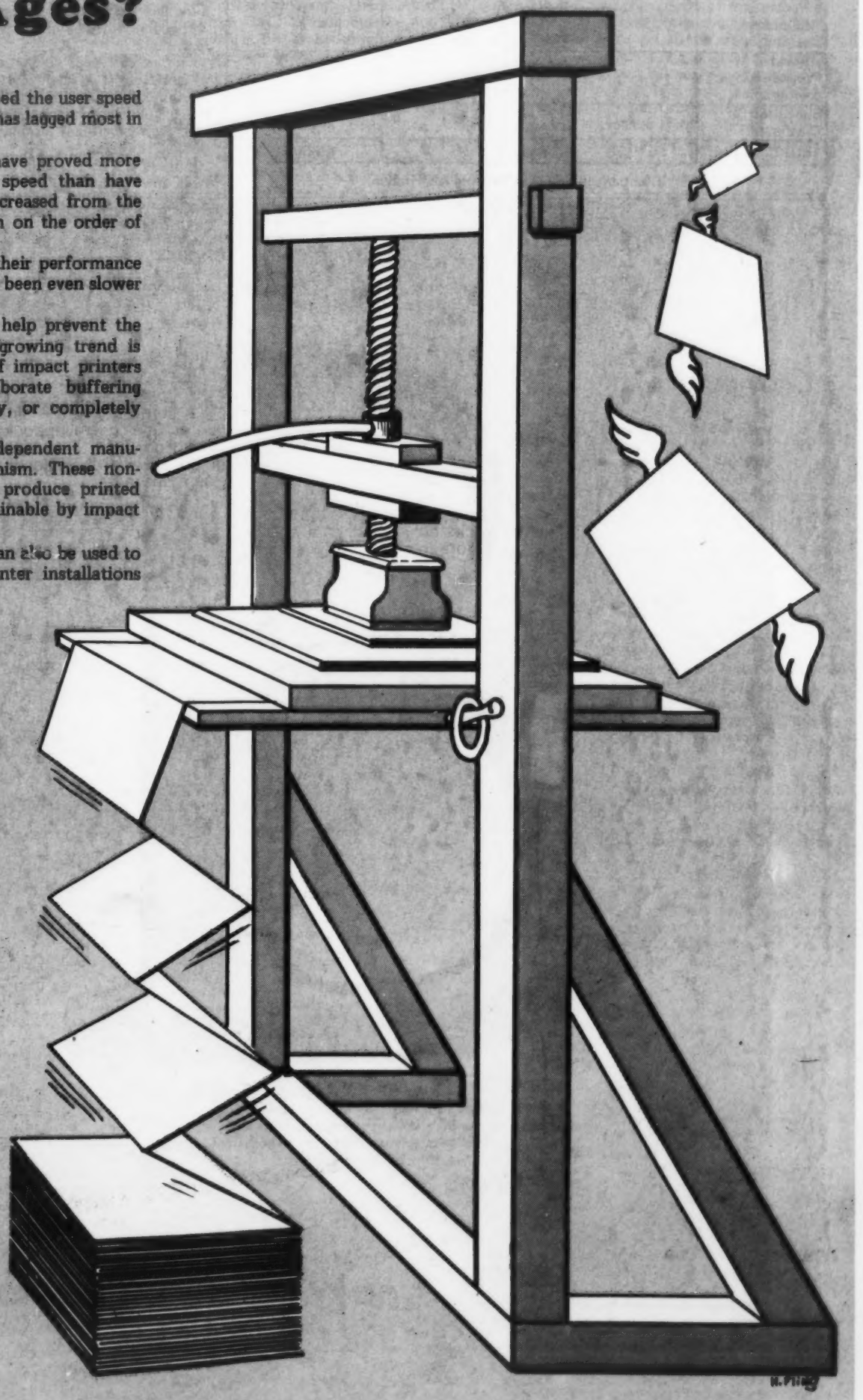
The adherents of computer output microfilm (COM) have taken a path to printing by not printing at all, but by writing the data onto microfilm at rates equal to those of many computer I/O channels.

Advantages inherent in microfilm, such as ease of reproduction and compact storage, are offset to a degree by the need for special equipment to view the output and to make copies. A larger capital expenditure and additional personnel training necessary make it advantageous for the larger users to adopt the COM approach.

But the movement to divorce low-speed I/O operation from the computer, allowing the CPU to proceed at its optimum rate, will continue in the future.

Industry experts are fond of emphasizing that the mechanical printing mechanism is virtually at the limits of its technology, eliminating the possibility of substantial increase in performance to match the CPU to the output device.

With the increase in off-line use, whether printing or COM, the user will probably achieve more efficient use of the computer than has been possible in the past.



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	Alternative 1	Alternative 2	Alternative 3
Description	Rent dedicated plotter; interface with in-house system.	Go to a service bureau with a tape that can be used as input for its plotter	Replace high-speed printer with printer/plotter
Equipment Cost	$250/mo including software to produce histograms, pie charts, parametric curves	$50/hr for service bureau system, including plotter	$250/mo including software
Programming	$3,000 for 10 programs		
Expected useful Life of each Program	1 yr		
Expected Traffic	50 graph/mo		
Allocated Equipment Cost/graph	$5	$0	$0 (entire cost allocated to printing)
Allocated Programming Cost/graph	$5	$5	$5
Execution Cost/graph	$.50	$1	$.50
Total Cost/graph	$10.50	$6	$5.50

Comparison of Three Plotting Alternatives

To Justify Cost of On-Line Plotting, Most Businesses Need High Volume

By Malcolm L. Stiefel
Special to Computerworld

Computer-driven digital plotters, respected as efficient tools in the engineering, architectural and scientific communities, have not yet earned a comparable warm place in the hearts of businessmen – and with good reason.

For most business applications, plotters just aren't cost-effective, and it doesn't look like they will be unless equipment costs come down by one or two orders of magnitude.

Lack of sufficient volume is the dominant factor. If a small plotter rents for $200/mo, for example, and turns out an average of two graphs per working day (a high figure for many businesses), it isn't pulling its weight.

If these graphs can be plotted by hand from the conventional printouts, the net cost to the user will be lower in most cases.

The total cost of automatic plotting includes application software (usually supplied as part of the rental or for a nominal fee), programming cost, equipment cost and execution time cost.

The term "programming" is intended to include analysis, design, coding and checkout.

Even the most sophisticated plotter software includes some restrictions which usually require the programmer to structure the format and sequence of data in a manner acceptable to the plotter.

Sometimes, but not always, the programmer can conveniently use the data in plotter output format for other purposes.

If a less comprehensive software package is available, the programmer is required to control the plotter directly – to issue commands for moving the pen, for drawing the line, for labeling the axis, for titling and so on. The application packages are designed to avoid this.

Even if the volume is higher, reducing the equipment cost allocated to each graph, the programming cost can remain prohibitively high if a separate program must be written for each graph (one hour of programmer time per graph is much too much).

In-house Criteria

This qualitative analysis leads directly to criteria for deciding whether a plotter can be justified in an in-house computer system.

- The plotter volume must be sufficiently large to lower the allocated equipment cost/graph to about $1 or less.
- The specific programs generating the plots must be run a sufficient number of times to lower the allocated programming cost/graph to around $1 or less.

The exact break points will vary from user to user, but most will be found in this range, because most simple graphs, i.e. most business application graphs, can be legibly hand-plotted for a couple of bucks or so.

Service Bureaus

If the volume isn't sufficient to make an in-house plotter feasible, sometimes a service bureau can supply a plotting service to fill the bill. In this case, the allocated equipment cost/graph is zero.

But the programming cost/unit rises if the volume goes down. Also, the execution time costs more than in an in-house system.

The decision criteria can be generalized, then, to cover the use of a plotting service. Digital plotting is justified if the sum of the programming and equipment cost is $2/graph or less.

Printer/Plotters

The printer/plotter can sometimes be a feasible alternative solution for an in-house system. Here, the equipment is used primarily as a line printer, not as a plotter, so most of its cost is absorbed by the printing function, and the cost/plot goes down.

The programming costs still can't be avoided, but the equipment cost is essentially zero, and

(Continued on Page S/8)

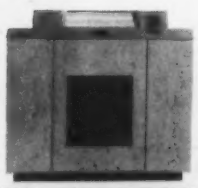
This B will print crisply, cleanly and with no vertical or horizontal misalignment even at 300 lines/minute (132 characters/line) because it's in one of the fonts for the unique Bright Industries' Oscillating Bar Printer.

This B comes from a 96-character font including upper and lower case, numerals and symbols galore. It's available in sizes up to one-quarter inch.

This B happens to be from a "Caslon" font, but with the Bright Bar Printer you can select fonts you were never able to use before (even Japanese) and change them in the field – in just minutes.

This B and all other characters will print longer and for less because the unique oscillating-bar print mechanism is simpler, less expensive and more reliable than drum or chain printers.

This B was brought to you by the Bright BI 1215 Bar Printer. It gives your printout a quality so faultless you could actually write letters with it – and not be ashamed to sign them.



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Better Than Spooling

Off-Line Printing Makes Systems More Economical

By Leonard L. Kilfoyle
Special to Computerworld

For years, data processing managers have been twisting and turning in order to handle production printing while they are managing numerous other DP tasks.

But where the DP manager once faced only the technological problems of hardware and software, he now faces additional problems of economical justification and large system management.

And, there is an ever increasing requirement for printed output. More and more, DP managers are turning to off-line printing as an aid to solving this conundrum.

In the communications field, DP managers use preprocessors to control lines and perform many of the housekeeping duties before committing mainframe time. Likewise, off-line printing not only eliminates costs associated with mainframe, but it eases scheduling.

Spool Partitions

At one time it was thought that production printing could be handled with a spool partition. Spooling effectively cuts core commitment and reduces CPU overhead by about eight %.

The CPU regulates all functions on a shared machine-cycle basis and is flexible by virtue of its operating system and software. The adaptability of its channel design makes it easily expandable.

The contention for cycle time, however, mounts rapidly in a multiprogrammed mode. The ASP and Power programs conflict with running programs. Data prepared on the first pass is stacked on the tape or disk committed to the printing function.

In order to get to the printer, the data seeks and the transfers multiply the number of interrupts in the channel, thus affecting the running time of other programs.

Resource Management

More effective resource management physically separates the production printing operation from the computing operation.

Using off-line printing, the DP manager can schedule his computing resources separately from his printing resources. Both must be scheduled, but the production printing can be scheduled using only the printing constraints, not as the "nth" variable in an already complex computing schedule.

Improved scheduling is directly related to the number of jobs a user can effectively process in a given time span. Reports printed on-line are the most common interference to smooth scheduling.

With off-line printing available, print jobs can be grouped together and processed to tape or with interspersed reports.

On the other hand, consider a computer with tape, disk and multiple printers operating under OS. A job comes up in the queue requiring a long printout. The program checks for resources and finds all printers busy. It gets knocked down a few times and the operator at the console decides to clear it to run. He directs the output to a tape drive or disk.

Now, the printer becomes available, but the long printout is writing to its intermediate peripheral. In the interval, the operator pulls in some short printouts which require changing forms.

It is easy to see, even with a pre-scheduled program log, how complicated such scheduling becomes, and the time lost represents dollars in operating time. The more peripheral operations involved, the more difficult it is to schedule properly.

There is far greater economic justification than simply equipment costs. Printing costs can be assigned on the basis of volume, periodic influx, and equipment costs.

Naturally, there are many other factors unique to the individual application, but their significance usually washes out in the face of the larger requirements.

Although not reflecting all possible parameters, cost curves dramatically indicate the divergence of real costs for printing 1,000 lines as the number of lines increase each month. (See chart on S/8.)

Because off-line printing equipment is not accompanied by overtime lease cost, a dramatic break occurs after 176 hours of on-line operation.

Successful Users

The First Wisconsin National Bank of Milwaukee uses four off-line printers to save about $48,000 a year when compared with on-line printing costs.

Each day some 230,000 trial balance records are printed out at the central DP center. Once a month 400,000 checking accounts are printed out as general statements.

The bank points out that off-line printer operators require less training than computer operators, thus reducing personnel costs. In addition, the printer tape provides a record data document, avoiding the necessity of running a whole computer program over again to reprint a report.

Field Enterprises Educational Corp. of Chicago uses five off-line satellite printers to obtain a 30% increase in efficiency over previous on-line systems.

The change to satellite printing came because of Field's multiprogramming environment. The on-line printers could not keep pace with the constantly increasing demands. The multiprogramming environment was providing less than 60% effective throughput efficiency; the present system operates with a throughput efficiency of better than 90%.

(Continued on Page S/8)

Syner-Data ALPHA Series line printers cost about $1000 less than competitive printers, yet produce up to six legible copies at 300 lines per minute. Alpha has many design features that provide advantages like these: unequalled reliability, compactness, choice of 80-column or 132-column models, proprietary hammer mechanism, a convenient disposable ink roller replacing the conventional messy ribbon. All of this at a low, low original cost with many significant operational economies. These include things like – low maintenance, easy loading of fanfold paper and a minimum of downtime. The ALPHA Series line printers make an ideal teammate for your mini-computer.
SYNER-DATA
For complete information on the Syner-Data ALPHA Series write Kurt Dexter, Director of Marketing, Syner-Data, Inc., Route 128, 133 Brimbal Ave., Beverly, Mass. 01915. Telephone: (617) 927-3222. In Canada, Syner-Data Canada, Ltd., 367 Ormont Dr., Weston, Ontario. Telephone: (416) 742-7804.
Kurt Dexter, Director of Marketing for Syner-Data presents the case for high reliability in low-cost line printers.

COM Needs More Intelligent Conception To Halt Waning of Initial Enthusiasm

By Mark Flomenhoft
Special to Computerworld

Stung by the meager response of users to computer output microfilm many former enthusiasts are now ready to drape COM in crepe. Why has the love song for COM turned into an elegy?

One reason is the dashing of high hopes. Many observers were awed by the speed of COM, its combined plotting and alphanumeric capabilities, its ability to imprint code marks for retrieval and its formatting versatility. Naturally, they scented a huge breakthrough, but the actual advantage COM affords must be carefully qualified. The disillusionment that has set in was predictable.

The fundamental deterrent to COM is price – not only the price of COM, but the entire micrographics field as well – readers and reader-printers, film processors and duplicators, cameras and terminals. A possible exception is the price of film itself.

COM is only one component of a total micrographics system. Thus, when a user opts for COM, he has also made a decision to abandon established office routine. It is unfair to make COM bear the entire burden of the conversion, but to the user the cost of a printed frame embraces the installation and operational cost of the entire system.

In many real-life situations this cost will surpass that of impact printers. Lowering the price of the recorder is not enough; other system components are equally cost critical.

The most variable of these elements is the reader and reader-printer facility. If there is only one unit, installation cost is minimized, but then employees will waste time, and the effective cost per report page mounts. For each added unit, however, the effective cost of a report page also goes up.

Not to be overlooked is the expense of producing copies of the film. But there also is excessive copying due to the preference of most people to work with paper rather than film. It should be evident that a substantial reduction in the combined cost of viewers and paper copy can change a marginal situation to one that justifies COM.

The disadvantages of micrographics will nullify its advantages under some conditions. Involved is the conditioned resistance of people to an unfamiliar medium. Objections are valid to the extent that film cannot be written on and is unsuited for browsing or multiple-page comparisons.

Readers that display two pages side by side are expensive. New procedures and skills must be learned, but on the other hand reported experience agrees that when indoctrination is well planned, the transition is smooth and swift.

Other experience, unfortunately, indicates training difficulties and obstinacy. It should be recognized that film can be updated only by reprinting it. If data is constantly changing, one must be willing and able to reprint frequently.

Another consideration is the expense of consultants who aid in personnel training and help design an optimum system. Luckily, this expenditure is normally nonrecurrent and manageable. It is likely to save more money than it disburses.

Need for "real-time" access to output has often been cited as an obstacle to COM acceptance. The need is real, but the objection is not justified. Of course, if a computer and an impact printer are so lightly loaded that a particular job can be run immediately, there certainly is no need for COM.

The more usual circumstance is that the engineer or other user must wait an appreciable time for his run. In comparison, the waiting time for processed film is apt to be much shorter.

There is nothing like numbers to provide a gauge of where matters stand. Tables I, II and III are drawn from surveys conducted by Auerbach Info, Inc. In Table I the greater ability of less expensive COMs to compete with impact printing should be apparent. Even so, when charges for readers (Table II) are added, it becomes evident that when duplicate copies are not in demand it is difficult to justify a COM installation.

Monthly Rental	Volume of Pages (000)				
	25	50	75	100	200
$1,550 (Impact Printer)	8.4	4.4	3.1	2.4	1.4
$1,600 COM	9.4	5.1	3.6	2.4	1.3
$900 (COM)	6.6	3.7	2.7	1.7	0.93
$425 (projected) COM	4.5	2.7	2.1	1.2	0.69

Table I★. Cost of Microfilming, Cents per Page

Reader-Printer Installation Monthly Rental	Volume of Pages (000)				
	25	50	75	100	200
$250	1.0	0.50	0.33	0.25	0.13
$500	2.0	1.0	0.67	0.50	0.25
$700	3.0	1.5	1.0	0.75	0.38
$1,000	4.0	2.0	1.3	1.00	0.50

Table II. Cost of Reader-Printer Installation, Cents per Page

★ Notes to Table 1: (1) Rental of $425/mo corresponds to fictitious $20,000 COM recorder. (2) Price of page includes cost of materials, labor charges, equipment capitalization charges, including both the COM and the film processor, but charges attributable to the reader and reader-printer installation are not included. (3) Service bureau charges can be negotiated and can range from 2.2 cent/page for low volumes to about 1 cent/page for large volumes such as 100,000 pages or more. If this price can actually be obtained, the figures in the table show that even for 100,000 page/mo. an in-house installation would not be justified.

Paper	5.2
Film (Service Bureau)	1.8
Film (In-House) (large quantities)	1.0

Table III. Cost of 10 Copies, Cents per Page

(Continued on Page S/8)

It shoots 132 characters at a time.

On the scarred and battled plains in the war of peripherals, Versatec wheels out Big Bertha . . . a printer/plotter whose big noise is that she makes no noise at all.

Her output sends shudders in the ranks: 132 characters per line on 11" paper.

She is also known under the code name of Matrix 1100A . . . a versatile, non-impact, hard copy output device that combines a 480 line-per-minute printer with a raster-scan plotter.

She has a 64 character set ROM that decodes standard ASCII input into perfectly formed 7 x 9 dot matrix characters.

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All for $8800.

If the pounding of peripherals is making your office sound like Normandy, our big gun can silence that.

THE MATRIX 11" PRINTER/PLOTTER

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Forms Design a Boon to Optimizing Output Speed

By Melvin Wahl
Special to Computerworld

New concepts in forms design, consider forms as more than merely data carriers. Modern forms designers seek to build into forms construction features that enable the forms to perform more than one job, thus increasing productivity of their computers through fewer print runs or more effective printing.

Take the case of a large paper roll manufacturer who used individual preprinted labels or hand numbered labels to identify stock items.

Delays were frequent, snafus in shipping schedules caused by unavailability of labels, and mistakes in matching labels to the type of paper occurred. Even a full-time clerk could not keep up with label requirements.

The designer found some computer time was available and developed the computer-numbered continuous label shown in Figure 1. Giant numbers on continuous labels are printed out, saving one clerk's time, and eliminating delays and errors in correctly tagging rolls waiting for daily shipments.

Figure 1. Computer-Numbered Continuous Label.

Computer printout is used to increase supplier productivity in the graph plan used by DeKalb, shown in Figure 2. The company had established averages for flock productivity, pounds of feed used, etc.

Formerly, individual charts were separately prepared for each breeder,

A chart was prepared showing upper and lower ranges for various averages and was printed as a screened area on a continuous form, the variable data to be printed out on the company's IBM 360.

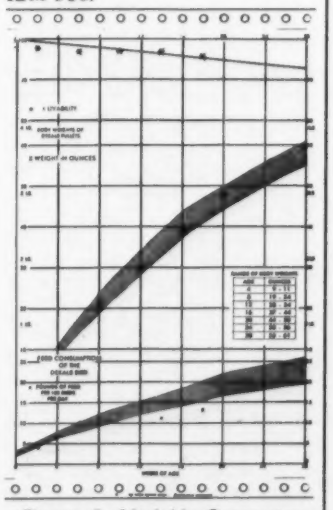

Figure 2. Variable Computer Data Overprinted on Special Form.

Each month the individual breeders furnish data which is entered into the 360 then printed out on the form, which shows how that particular breeder's operations compare with the average.

The form is run over the printer with the 12-in. dimension as the width. When detached, it is turned for reading. The dimension now becomes the depth of the chart.

Identification and authentication of invoices submitted for payment by hospitals and other medical units was made easier when the State of North Carolina put its computer to work. Figure 3 shows how a payment authorization (on the left) carries with it a series of special labels to be affixed to the vendor's bills.

A continuous form permitted one-pass writing of both formal authorization plus six labels to be given to various vendors to use on their invoices submitted to the state. The labels flag the specific authorization and eliminate clerical checking and needless delays in processing payments.

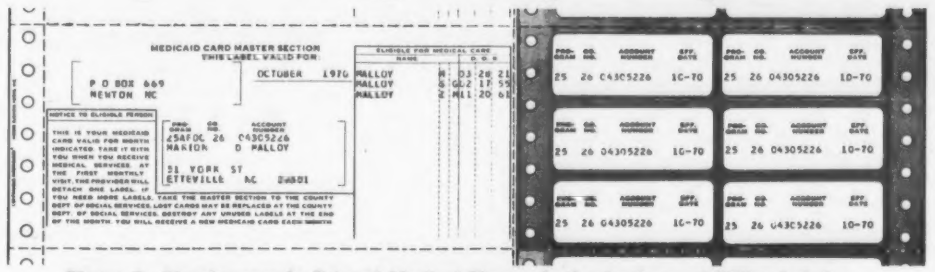

Figure 3. Simultaneously Printed Medical Charge Authorization and Billing Labels.

A computer can, with relatively simple design, process the entire invoicing, addressing, mailing, and remittance production jobs in one-pass writing. The Moore Speedimailer, for example, consists of a pre-sealed envelope with all inserts completed by computer, with a return envelope as an integral part.

The pre-sealed mailing envelope is computer addressed, with customer identification transferable to the return envelope, permitting sorting of returns before envelopes are opened. The mailing envelope encloses one or more inserts up to six, two of which comprise the return envelope which is self-addressed and postage paid.

There are many opportunities for the forms designer to build into his forms the type of features and constructions that will greatly increase the usefulness of computer output. Forms can do more than merely carry data; they can be designed specifically to aid in solving problems and in effecting savings.

Melvin Wahl is a director of Moore Business Forms, Inc.

Hardcopy for your data terminals?

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Paper Cost Not Only Factor When Choosing Printer

By H. Milton Reed
Special to Computerworld

The potential user often makes the mistake of focusing too heavily on the cost of paper when comparing impact and nonimpact printers.

Although the cost of paper is an important consideration, especially where high-volume printing is required, all significant system cost factors must be analyzed. These include:

• Initial equipment cost (including interface equipment) – a 600 line/min electrostatic printer sells for approximately $6,000, or roughly 50% of the price of an impact printer with comparable performance. Equipment cost savings range from $5,000 to $9,000 typically in this case, and interface equipment (controllers) for electrostatic devices is generally less expensive.

• A combination electrostatic printer/plotter in the 600 line/min speed range may not only mean a $5,000 to $7,000 savings on the printer, but an additional $5,000 to $6,000 may be saved if a plotter is replaced by the combination unit. The electrostatic plotter, moreover, provides increased efficiency and savings by reducing the time required for plotting.

• Since electrostatic printout devices are small and require no extensive adjustments, they can be set up in a couple of hours.

The monthly maintenance charge for a 600 line/min electrostatic printer is approximately $25. Maintenance charges on impact printers in this speed range run anywhere from three to six times that amount. Savings with the electrostatic device range from $500 to $1,500 annually on maintenance alone.

• The 600 line/min electrostatic printer has a meantime between failure (MTBF) of 3,000 hours, which accounts for the economical maintenance charges. System downtime and expenses incurred are improved over impact printers. It is not unusual for a user to have backup impact printers.

• Operator time and training costs are minimal with electrostatic printers. The absence of many moving parts eliminates adjustments, alignment and calibration.

• Costs of 1.2 cents to 3.5 cents per sheet are now typical of electrographic paper. This is compared to three-part impact printing paper, which typically costs from 0.4 cents to 0.8 cents per single sheet, and 1.2 cents to 2.4 cents for the three parts. In the near future, electrographic paper will approach the cost of plain paper as volume usage grows.

Two types of toning are used – liquid and dry. The liquid method of toning is generally cleaner, easier to handle and control the toner concentration, and requires no heat fixing. A six quart bottle of liquid toner is sufficient for 15,000 ft to 20,000 ft of paper, depending on the amount of data being printed, and the darkness of printout desired. This amount of toner costs only $20 to $25, which is competitive with the cost of impact printer ribbons.

• A variety of single and multipart forms must be kept in stock for impact printer usage. The costs associated with this inventory are more than stocking only the single part electrographic paper.

• Accessory equipment, such as form bursters and collators, add to impact printer system cost when multiple copies are required. Some DP activities require up to 30 copies, and additional reproduction charges are incurred if more than 10 copies are required.

An expensive practice in the industry is to use computer or off-line peripheral equipment time to re-run the data for additional copies.

Because an electrostatic device requires the use of an electrically conductive paper, and deposition is made on only the side of the paper with the dielectric coating, it is not possible to simultaneously produce multiple copies. A common solution is to use an office copier for the occasional multiple copy requirement.

Electrostatic printers, combined with high-speed copiers, offer excellent possibilities in the future. All copies produced in this manner are of "original" quality, and large DP center usage of printer/copier combinations will increase in the future.

Since a single-part form is used by the impact printer in this application a niche is developing here for high-speed, non-impact devices at greatly reduced printer costs. The printer/copier combination provides the luxury of forms overlay, selectable number of copies (not limited to the number of copies in a multipart form), size reduction, and automatic collating.

• There is essentially no noise produced in the writing process, an asset almost exclusive to electrostatic writing.

• Direct and indirect costs can be attributed to the handling and distribution of printed copies to the recipients. While this is an unavoidable expense in most applications, applying to both impact and non-impact printers, certain cost savings are possible in some applications by special purpose electrostatic systems.

H. Milton Reed is vice-president of marketing at Versatec.

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Aids Scheduling

Off-Line Printing More Economical Method

(Continued from Page S/3)

Automatic Computer Services of New York City handles brokerage accounting for about 65 firms. Using three satellite printers, more than 20,000 transactions daily are processed.

Because of the wide fluctuation of trading volume, off-line printing has proven the only way these records can be economically processed.

Texas Instruments, Dallas, operates four off-line printers 24 hours each day. In addition to general accounting, it uses off-line printing for sales, billing, accounts receivable, backlog, and manufacturing reports. By switching to off-line printing, the firm notes a 3-fold production increase with no additional equipment cost.

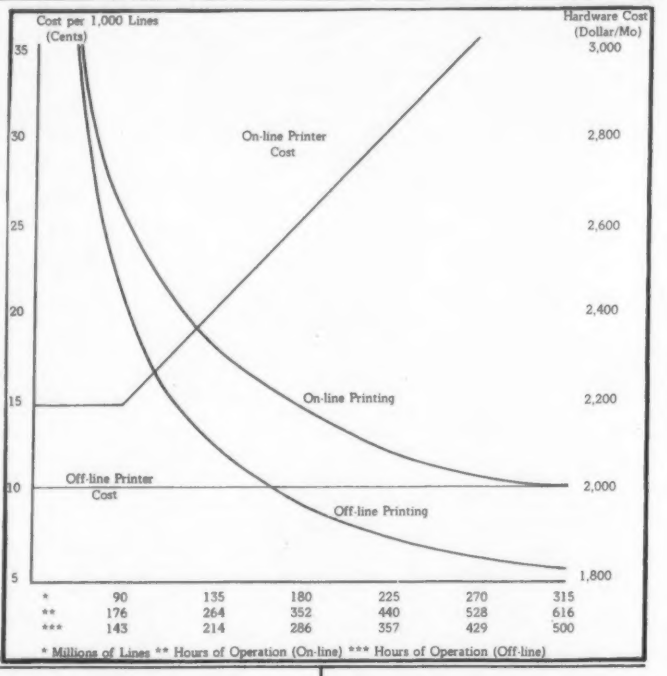
Off-line printers offer users of the numerous 360 and other third generation computers an opportunity to increase printing production while maintaining equipment expenditures.

In addition, separating printing from computing aids resource management.

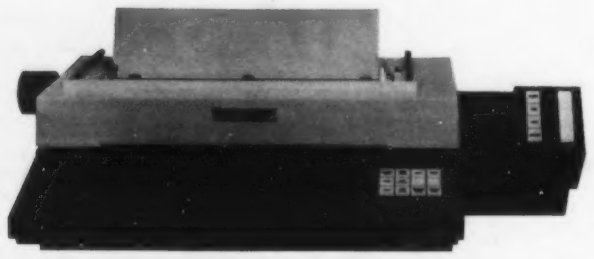
Time Requirements

Off-line printing reduces the time requirements of the 20K of core used by output writers by about 90% and frees up to 10% CPU for each on-line printer.

Leonard L. Kilfoyle is marketing manager for printer systems, Data Products Corp., Woodland Hills, Calif. Previously, he was industry marketing manager for Xerox Data Systems.



Cost Comparison of Off-line vs. On-line Printing



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Plotting Cost Justified by Volume

(Continued from Page S/2)

execution cost is modest, so the break-even point occurs at about half the volume needed to justify a comparable dedicated plotter.

But the printer/plotter has its limitations. It usually can't generate more than one copy at a time, whereas impact line printers can yield up to eight copies on NCR paper, and up to six copies with carbons.

Overall, the printer/plotter is more cost-effective for the businessman than the dedicated plotter, as long as he can live with its limitations.

An Illustration

To illustrate, suppose a manufacturing company with an existing in-house system has developed its applications to the point where management is starting to get periodic statistical analyses in addition to day-to-day operating information.

Management receives sales forecasts, vendor history and various correlations of financial statistics. It keeps track of product sales in different territories, and can prepare special reports to monitor the programs of test-marketing efforts.

As time goes on, top management demands that more and more data be presented in parametric curves, histograms and pie charts. After a while, the DP manager finds that he is tying up a clerk for a week every month, just turning out graphs, which are converted to Vu-Graphs for briefings.

Management starts grumbling that the plotting is too slow, so the DP manager conducts a plotter feasibility study. His findings are summarized in the chart on Page S/2.

The DP manager points out that if the traffic were 500 graph/mo for the same set of applications, the unit costs would come down to $1.50 for the dedicated plotter (that 50 cents of computer time remains a factor), $1.50 for the service bureau, and $1 for the printer/plotter.

The company concludes, after examining the alternatives, that it should remain with hand-plotting.

Malcolm L. Stiefel is an independent data processing consultant.

Response to COM

(Continued from Page S/4)

The tables illustrate the decisive role of prices. Every downward break qualifies a new set of application areas as a potential beneficiary of COM.

Table III provides a glimpse into the applications calling for many duplicate copies. Impressive savings are possible at even modest report page volumes. Still more savings accrue when shipment of printed matter must be made to distant points, or to scattered points. The question of information storage and retrieval is a separate matter, and militates strongly in favor of COM and microfilm.

What COM needs is not crepe, but more intelligent conception and more resourceful application.

Mark Flomenhoft is the editor of Auerbach Graphic Processing Reports and a contributor to the Auerbach Technology Evaluation Series.

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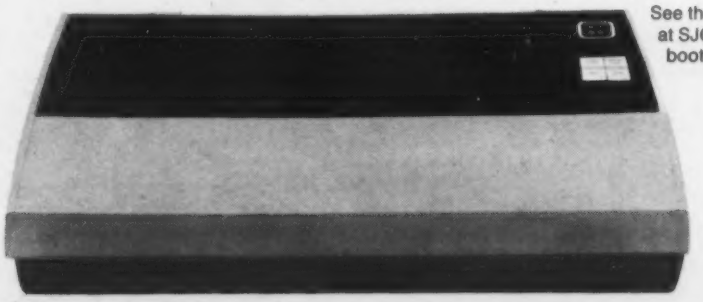

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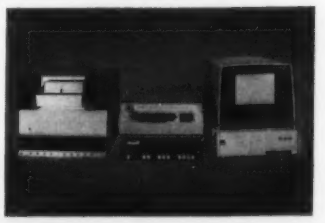

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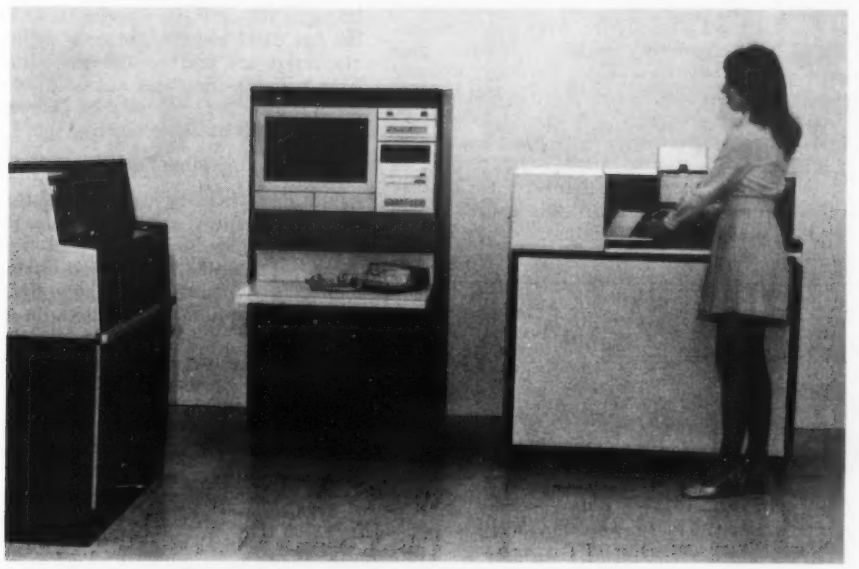

Configured as a communications terminal, the Mohawk Data SYSTEM 2400 can convert a tape that wasn't originally intended for communications, and then transmit it in a compressed, control-coded format.

It will gather source data, filter it, and block it for more effective input to your CPU. The SYSTEM 2400 is fully compatible with the IBM 2780. And, with the addition of the MDS 2401 Communications Controller, it becomes a truly intelligent Data Communications Terminal.

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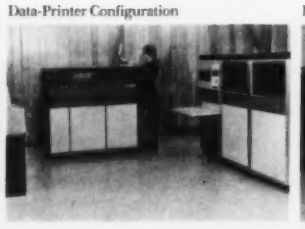
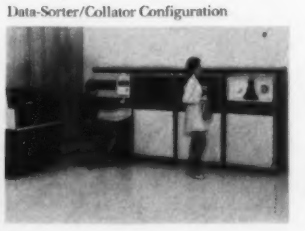
Data-Editor Configuration

Data-Printer Configuration



Data-Converter Configuration

Data-Sorter/Collator Configuration



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MDS

Make the Most of Your 1403: Four Methods Suggested

By J.H. Brownlow
Special to Computerworld

In most data processing installations, printing speed and efficiency can be enhanced in four major areas: selection and customizing of the print train (or chain), software practices, operational procedures, and forms design.

For example, the IBM 1403 printers, models 2 and N1, are rated at speeds of 600 line/min and 1,100 line/min, respectively, when operating with a standard 48-character set. This set is repeated on the train five times, for a total of 240 characters.

A train with fewer different characters, but repeated more often, results in higher printing speeds. IBM's 42-character, high-speed alphanumeric train, for example, allows printing speeds of up to 1,250 line/min on the Model N1, and the all-numeric train permits up to 1,400 line/min.

In contrast, with the expanded 84-graphics text printing train, the printing speed for the Model N1 drops to 775 line/min. For maximum speed, the train with the least number of characters needed for the job should be selected.

It is often desirable to have additional print trains available to optimize special or high-volume jobs.

With the IBM Universal Character Set (UCS), a print train can be further customized to specific requirements. Only those characters and symbols necessary for the job to be performed would be ordered.

User Can Specify

The user can specify that more As, Es, Os and other frequently used characters be included in his train than rarely used characters, such as Qs, Zs and #s. Characters he never uses can be excluded from the train altogether.

Examples of optimizing are found in the standard G11 (63 graphics, Ascii), P11 (60 graphics, PL/1), and T11 (120 graphics, Text Printing) trains. In configuring these print trains, a number of representative user jobs were analyzed.

This analysis tabulated the character usage and was used to develop optimized trains for these character sets. Improvements in printing speed of between 10% and 30% were the results of this optimization.

Software Considerations

In a multiprogramming environment, with a number of jobs running in separate partitions, printing workloads must be balanced flexibly to job priorities and total computing workload. Spooling programs, such as IBM's Hasp for OS and Power for DOS, can achieve this balance and insure that print-bound jobs don't break down schedules.

Power, for example, intercepts all PRINT instructions, stores them on disk in print-ready format, and conveys them to an available printer at a convenient time.

There is no need for reprogramming and the time-consuming tape operations required in earlier spooling programs. For maximum speed, both Hasp and Power send chained printer-related commands directly to the printer.

Programming practices also affect printing efficiency. For example, while some high-level programming languages allow spacing before or after printing, spacing should always be done after printing for optimum printing speed.

A standard programming practice of blanking the output area prior to developing the field insures that only printable characters are sent to the print buffer. This prevents needless scanning of the UCS buffer for unprintable characters, which in turn can slow printing speed.

Operating Practices

Printing efficiency is significantly reduced by frequent setups to change paper size, forms, or the number of copies. Whenever possible, printing requirements should be standardized company-wide, to use the same number of copies on stock paper.

Numerous types of preprinted forms, with their associated carriage tape changes, should be minimized. For maximum efficiency, the printer should be kept running uninterrupted as long as possible.

Intelligent forms design can reduce the number of lines to be printed and so optimize printing efficiency.

As an example, many conventional forms with a vertical organization of contents – customer statements, invoices, etc. – can easily be redesigned in a horizontal (side-by-side) format, with four lines of name and address information printed simultaneously with four lines of detail.

One user who changed his customer statement forms this way reduced his printing time approximately 50%. Wherever possible, "two-up" or more should be considered when designing forms.

J.H. Brownlow is senior product administrator, IBM Data Processing Division, White Plains, N.Y.

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Electromechanical impact printers are the result of the original invention of typography. In this case, the aux-relief font makes the appropriate impression on the paper by striking the ribbon and transferring the color particles in the ribbon to the paper upon impact.

Impact printers historically have dominated the DP industry. They are machines which fit a wide range of applications, since they print on virtually any type of paper.

Drum printers are inherently very fast, with speeds up to 2,000 line/min. The major drawback of the drum, that of wavering horizontal lines, has been largely overcome through the chain and later train printers that are nearly as fast as the drums.

The penchant of most users to print multipart reports is well served by the impact printer. Competing technologies have not as yet overcome their inability to produce carbon copies at a low price.

High paper costs in most of the nonimpact printers have also been advantageous for the impact printer that can print on low-cost untreated paper.

The fact that impact printers use moving parts in the writing process places a limit on the speed by which information can be written.

Impact printers will continue to dominate in many applications, especially where one to 10 output copies are required, as in order acknowledgement, invoices, and inventory.

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FDA to Record Hospital Emergency Cases

CW Washington Bureau

WASHINGTON, D.C. – The Food and Drug Administration will use an IBM System 360/50 housed in its building here as the core of a nationwide electronic system to provide overnight reporting of personal injuries treated in hospital emergency rooms.

The system, to be known as the National Electronic Inquiry Surveillance System (Neiss), will be inaugurated in July.

Malcolm W. Jensen, director of FDA's Bureau of Product Safety, said Neiss will provide information for prompt investigation and possible remedial action. More than 30,000 deaths and 20 million injuries – a majority of which are product related – occur annually in or near the home.

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April 28, 1971

CI Notes

OCR Market Growth Shown

NEW YORK – The Optical Character Recognition (OCR) market will grow from $300 million in 1970 to $2 billion by 1980, according to Frost & Sullivan, Inc., which has published an analysis and forecast of the market. The report covers optical character readers (OCR), optical bar and mark readers (OMR), magnetic ink character readers (Micr) and retail business forms. Forecasts are included through 1980 by product and end use.

By 1975 the OCR industry will handle 25% of all input data to computers and will resume its 25% to 30% growth rate, the survey predicts.

Ampex Delivers Memory Stacks

CULVER CITY, Calif. – Ampex Corp. has begun delivery of militarized core memory stacks to Hughes Aircraft Co. under a contract exceeding $700,000. The stacks will be used in memory systems for Phase II of the Defense Department's 407L Tactical Air Control System program developed by Hughes' Ground Systems Group in Fullerton, Calif. The 407L program provides mobile tactical command and control systems for the U.S. Air Force. The Ampex stacks ordered use 3-D, 4-wire design, 22-mil Ampex lithium cores and 4,096-word by 18-bit configurations.

ADR Sells D.C. Computer Center

PRINCETON, N.J. – Applied Data Research, Inc. has entered into an agreement to sell its computer center in Arlington, Va. to Software Systems, Inc., which will continue to operate the facility at its present location.

The move leaves ADR with one service center, and will allow the firm to operate in the black, according to industry sources.

Supershorts

Core, Ltd., a sales and marketing distribution firm headquartered in London, has signed a $3.7 million marketing agreement with Centronics Data Computer Corp. The agreement requires Core, Ltd. to purchase at least 2,000 Centronics Model 101 line printers, and related spare parts and accessories, over a three-year period starting in the second quarter of 1971.

– – –

Dicom Industries has landed a $300,000 contract from Hewlett-Packard for 344 Cassette Magnetic Tape Systems. The Model 344 will initially be incorporated by Hewlett-Packard in the 8580 Automatic Spectrum Analyzer and 8543 Automatic Network Analyzer System.

– – –

The Federal Aviation Administration has awarded a $4,768,861 addition to an existing contract with the IBM's Federal Systems Division to develop National Flight Data Processing software for use in the computer-based, semi-automated air traffic control system now being implemented.

– – –

ITT Semiconductor has entered into an exclusive sales and distribution agreement with American Micro-Systems, Inc. to distribute and sell AMI semiconductor products throughout Western Europe.

Data Communications Study

Information Services Area to Jump 72%

NEW YORK – The compound growth rate for data communications transmission volume will be 40% between 1970 and 1974 and 30% in the 1974 to 1980 period, sparked by heavy advances in the growth of communications used in information services and health care.

The information services area will see a 72% compound growth in data communications transaction volume during 1970 to 1974 slowing to a 49% compound rate in the last six years of the decade, according to statistics compiled by Booz, Allen & Hamilton, Inc.

The health care field will account for growth rates of 71% and 44% in the same time spans, according to the survey. The third fastest growing area will be banking and finance (60% and 21% respectively), followed by insurance with growth rates of 53% and 22%.

The slowest growing areas in terms of transaction volume will be in manufacturing (12% and 11% for the decade) and in the securities field (14% and 10%), according to the report.

Transportation will account for a 25% growth in the first part of the decade and a 20% compound growth in the second half, while retailing will show a 30% jump in the first part of the '70s and a 32% rise in the latter half. Government use will increase by 25% and 20% during the respective periods.

The most dramatic application in the '70s will involve point of sale terminals and interbank payments, closely followed by securities customer accounting, remote batch processing and health care claims, the BAH study indicates.

At the same time, BAH predicts that the advent of domestic satellite systems, specialized common carrier services, and two-way broadband cable systems will have the greatest impact on the data communications marketplace during the coming decade. Other important technological advances will involve data terminals with solid state technology, fourth generation computers and packaged application programs.

According to BAH research, there are presently 250,000 installed data communication terminals and the terminal area is showing a 50% annual growth rate. In 1970, BAH said, there were 15 to 25 billion transactions in the data communications area and the common carrier transmission revenues were between $.3 and $.5 billion.

Looking beyond the 1970 timeframe, BAH said that the largest impact on the data communications business will be introduction of broadband cable systems for residential data communications.

In addition, the firm predicts that point of sale systems will be fully integrated into the payments mechanism sometime in the decade after the '70s.

Full automation of the securities exchanges will have a great effect on the future of data communications after the 1970s as will extensive use of communications for patient diagnoses and monitoring, BAH projected.

CTC's Antitrust Suit Charges Honeywell With Restraint of Trade

By Edward J. Bride
CW Staff Writer

DENVER – A customer/competitor of Honeywell has filed a $10.5 million antitrust suit against the computer industry's number two, charging the merger with GE was illegal, constituted a monopoly and resulted in restraint of trade.

All this, combined with Honeywell's alleged refusal to deliver "items and capabilities promised" to Computer Time Corp. (CTC), "eliminated" CTC as a competitor in "interstate trade and commerce involving the marketing or leasing of time-share products," the suit charges.

Honeywell, refusing comment on its legal matters, received an extension to file its reply, which is now due this Friday (April 30).

CTC seeks $3,150,000 for "actual damages," trebled to $9,450,000, plus an exemplary award of $1 million.

According to the suit, at least 16 capabilities or characteristics of a Honeywell H1648 system were promised to CTC but not delivered, including acceptance of both BCD and Ebcdic codes, assignment of several passwords to each user, and inclusion of a Calcomp plotting routine.

The suit charges that the equipment was promised "substantially new" but "was discovered to have been used for approximately 5,000 hours." Furthermore, according to the plaintiff, Honeywell did not have adequate maintenance support in the Denver area, and "no software maintenance support whatsoever," despite promises to the contrary.

The suit continues to charge the system was never installed "as originally promised," and that the system had "an incredible amount of downtime," causing CTC to "lose customers and good will . . . and generally be driven out of business."

The suit charges Honeywell was apprised of the difficulties with the H1648 and promised to replace the system with a "Honeywell GE 430," then "refused to honor such commitment."

The antitrust implications enter the charges when CTC states Honeywell sells and leases computers through its Computer Control Division (CCD), and sells time-sharing capabilities interstate through the Information Systems Division (ISD).

While CCD made the lease/purchase agreement with the plaintiff last summer, the division "did and still does . . . refuse to deliver" certain items which, the suit charges, were being used by ISD.

The suit further states the GE 430 was "substantially the only other time-share system" priced near and configured similarly to the 1648. The GE-Honeywell computer merger "effectively permitted defendant to gain total control over the General Electric 430 computer system series," the suit charges.

This control, and the internal advantage between CCD-ISD, resulted in "actual monopolization" and restraint of trade, violating the Clayton and Sherman Antitrust Laws, and the Robinson-Patman Amendment, the suit charges.

Ampex to Produce Semiconductor Chips for Own Memory Products

CULVER CITY, Calif. – Ampex Corp. has taken the plunge and will enter the fierce competition in the semiconductor marketplace, making it one of the first large magnetic memory firms to move fully into the semiconductor area.

The firm will produce semiconductor chips for its own memory products and will sell chips to other manufacturers by the end of this year from a plant recently acquired from Varadyne, Inc. in Santa Monica, Calif.

Ampex has been producing semiconductor memories since last November, but until now had been buying the chips from various suppliers, so the new move will not only introduce a new competitor to the marketplace, but also take a customer out of that market.

The new facility is a fully developed fabrication plant of approximately 14,000 sq ft containing most of the equipment necessary to produce chips and other devices, according to Eugene E. Prince, vice-president and general manager of the firm's Computer Products Division.

The acquisition, which is said to be for a "sizeable amount" of cash, is the third step in the Ampex entry into this market, sources said. First the firm worked on memory design using semis, then developed a packaging capability to make devices, and now has moved into chip production.

Prince said the move proved that Ampex was "prepared to take an active part in the emerging semiconductor memory business," which, he estimated would "catch the growing core memory business in sales volume within five years."

Ampex has previously worked with Fairchild, Intel and Intersil in some packaging areas.

French Government to Aid Domestic Computer Users

CW European Bureau

PARIS – The French government will aid domestic computer users and the growing French software industry through a new program of loans and grants.

Computer users will be able to get loans of up to 50% of the installation cost when they successfully implement computer systems under the program and software firms will get government grants for applications involving technically advanced software.

It is estimated by some industry sources that the French software industry, which is 70% French owned, is presently the world's second largest behind the U.S.

The industry had estimated revenues of $218 million in 1969 and is expected to have sales of over $754 million by 1975. In addition, French government figures estimate that service bureaus and consultants had a volume of $87 million in 1969 and that sales will top $300 million in 1975.

YOU ARE INVITED TO ATTEND THIS ONE DAY

COMPUTER PROTECTION INSURANCE WORKSHOP

Monday, June 14, 1971, PICK CONGRESS HOTEL—CHICAGO

Produced jointly by the publisher of BUSINESS INSURANCE newsmagazine and the publisher of COMPUTERWORLD newsweekly

To help you solve your computer problems of safety/security/insurance, the publisher of Business Insurance and the publisher of Computerworld are planning an exciting shirtsleeve workshop that promises to go a long way toward giving you peace of mind about your computer installation.

The workshop, to be held in Chicago on June 14, is a unique opportunity for you and other key executives within your organization who are responsible for the "complete picture" – for the total safety/security/insurance of the computer operation.

It will also be of special interest to executives whose corporations are planning to use a computer either on an in-house or share-the-time basis.

The workshop will be equally interesting to insurance carriers, agents and brokers, and safety/security suppliers to the computer industry because it will give them a much deeper insight into the problems that face corporate management and how those problems are being solved.

The workshop will be an extremely busy, full day experience for you. Sessions will be conducted by some of the nation's foremost authorities on the safety/security/insurance problems involved in your computer operation. The distinguished "faculty" is being selected now by the editors of Business Insurance and Computerworld based on the individual's knowledge, practical experience in the field, and ability to communicate to a workshop audience of management executives.

If you have any doubts about the safety/security/insurance of your computer installation . . . if you wake up worrying whether you are fully and properly protected . . . if you want the assurance of comparing your computer risk-management methods with those of other companies . . . and if your mind is wide open to absorbing the latest ideas, techniques and methods of "risk-free" computer management—then this one-day workshop is for *you*!

An Early Sell-out Expected

A great deal of interest in this workshop had already been expressed *before* the decision was made to go ahead with it, and *before* any announcement was made in Business Insurance or Computerworld.

We sincerely believe that because this workshop offers much-needed, timely information to corporate management about the risks involved in the computer operation—and knowing what to do about those risks—that registrations at the workshop will be spoken for quickly.

Here are the details. Then, simply use the coupon below to send your advance registration promptly.

The Computer Protection/Insurance Workshop will be held at the Pick Congress Hotel overlooking Chicago's beautiful Grant Park, on Monday, June 14. The registration fee for the full day's program (including a continental breakfast, full lunch, two coffee breaks and a special workshop notebook) is $105—with an *early registration fee of only $90.* By registering now *before June 1, you save $15. Additional* registrations from your company, when submitted together, cost only $75 each.

If your plans change later on, you are entitled to a full refund (less a $15 handling charge) if we are notified before June 14. Use the handy coupon below to send in your Advance Registration *today*. That way you'll avoid the disappointment of an early sell-out, while taking advantage of the substantial discount.

MAIL THIS EARLY REGISTRATION FORM TODAY — SAVE $15

Mail to: **COMPUTER PROTECTION / INSURANCE WORKSHOP**
Business Insurance/Computerworld, 740 Rush Street, Chicago, Illinois 60611

Please register the following for your workshop at the Pick Congress Hotel, Chicago, Monday, June 14, 1971:

☐ I am enclosing a total of $_____, figured at $90 for the first registration (if postmarked before June 1), otherwise $105, and $75 for each additional registration from the same company. ☐ Bill me.

CW 28

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FIRM _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Additional registrants _____

_____

REFUND GUARANTEE: If my plans change and I cannot attend, I will receive a full refund (less a $15 service charge) if I notify you before June 14.

NOTE: The registration fee includes a continental breakfast, two coffee breaks, full lunch and a special workshop notebook.

☐ Check here if you want the Pick Congress Hotel to send you room information.

Service Bureau Industry States Views on Bank DP

By Alan Drattell
CW Washington Bureau

WASHINGTON, D.C. – At a hearing before the Board of Governors of the Federal Reserve System here recently, representatives of the service bureau industry, as expected, lined up against bankers to present their views on permitting banks to provide DP services.

The hearing is part of the process involved in implementing the Bank Holding Company Act of 1970 passed by Congress.

The proposed regulatory amendment that would permit bank holding companies to provide bookkeeping or DP services involves those services provided for the holding company and its subsidiaries, other financial institutions or for persons other than the holding company involved.

Appearing for the Association of Data Processing Service Organizations, Milton Wessel, general counsel, and Bernard Goldstein, president of the association and head of United Data Centers Inc., cited landmark rulings as precedent-setting guides for the governors.

The rulings are the Justice Department's consent decree with IBM in 1956, and the Federal Communications Commission's recent decision on the interdependence of computers and communications [CW, March 24].

"Let the boys (the banks) come into (the industry) whole hog, but have the banks set up (DP operations) under a separate name . . . eliminate the relationship to the parent," Goldstein said.

"We're not talking excess capacity (of the banks); we're talking competition. We want fair competition and we want to fight the banks in a fair way . . . what we're urging is the maximum separation concept," Wessel explained.

Wessel also cited the "captive" customer base of banks, putting service bureaus at a "competitive disadvantage" with them.

The specter of invasion of corporate privacy was raised by Frank R. Lautenberg, president of Automatic Data Processing Inc., who said: "Businessmen must have confidence and feel that they can show their financial reports to their bankers without fear that the bankers will turn around and become their competitors. Broad expansion by banks into the computerized payroll data processing service business does not beget this kind of confidence."

On the banking side, John Reed, an executive vice-president with First National City Bank of New York, represented the New York Clearing House Association. He said that the application of DP to the commercial banking industry "is really in its infancy," and he indicated that no one really knows what the future growth will be. "The commercial banking industry," he added, "should not be denied to develop in a natural way."

Speaking for the American Bankers Association, Russell Fenwick, vice-president of the Bank of America, opted for Form A of the three major language alternatives up for consideration by the board. Fenwick added that Form A "safeguards the public interest by assuring fair and open competition."

Form A provides bookkeeping or DP services (1) for the holding company and its subsidiaries, (2) for other financial institutions of a financially related nature and (3) other bookkeeping and DP services for others. It also provides that the operating revenues derived from such services performed by the company and not authorized under (1), (2) or (3) shall not exceed 50% of the total operating revenues of that company.

Study Shows ICL With Almost Half Of British Computer Market in '69

LONDON – International Computers Ltd. captured 49.4% of the British computer market in 1969 compared to only 27.7% for IBM, according to the British Department of Trade and Industry statistics released recently.

ICL is reported to have 39.9% of the private sector compared to IBM's 35% and 69.2% of the government market compared to IBM's 12.1%, according to figures published in the London *Times*. ICL is said to have 81.1% of the local government market to IBM's 3.3% in this area.

Breakdown

The Honeywell-GE combine was able to grab 7.9% of the 1969 market, followed by NCR (3.1%), Burroughs (3%), Univac (2.9%) and Control Data (1.5%).

Overall, British firms controlled 52.3% of the market, according to the reports, and American firms had a 47.2% share, with the remainder going to the Philips organization of Holland. The entire market was estimated to be up over 16% over 1968 and a 38% increase was estimated for the 1970 year.

Communications Use For Minis Seen Growing

CLEVELAND, Ohio – Approximately 15% of the minicomputers in use today are being used for communications applications, but by 1975 60% of the mini systems will be in the communications field, according to Julian Kindred, Cleveland Area sales manager of Victor Comptometer Corp.

Speaking at the recent Second Annual Cleveland Business Show, Kindred predicted that the overall market for minis and miniperipherals would reach $1 to $1.5 billion by 1975, up from $300 million estimated for 1971.

He said the current shakeout in the industry had reduced the number of manufacturers to around 40 from 70 earlier and that the number would further erode to approximately 20 manufacturers.

Going Once, Going Twice... Sold for Only $260,000

By Edward J. Bride
CW Staff Writer

NEW YORK – "Eighty, who will give me eighty . . . sold for $260,000!"

With a little more excitement and eventual deliberation, four bidders among the 40 present participated in the auctioning of an IBM 360/30 for a world record price.

The audience was comprised mostly of either users or equipment brokers, like the successful bidder Comdisco (Computer Discount Co.) of Des Plaines, Ill.

One of the two Comdisco representatives, Ken Pontikes, purchased the control panel of the Univac I at the previous auction last July, also held at the Parke-Bernet Galleries here.

Pontikes has the Univac control panel in his home, and intends to use it to control a kaleidoscopic light display, according to a company representative.

An official of the gallery conjectured Comdisco would separate the Model 30 from its peripherals and sell it in various parts. When new three years ago, the machine would have sold for around $559,000, a gallery official stated.

It had been hoped that the 30 would bring around $225,000, the official related after the successful auction, and that price seemed unlikely with the surprise announcement of the IBM 360/22, which could have "deflated the value of the three-year-old computer."

The actual bidding took five-plus minutes, while the normal is one and a half, a gallery representative suggested. "It was fast to $250,000," he related, "then it slowed, to great deliberation." One attendee described the five minutes as "fierce but slow" bidding; another described the process as "intense" competition.

The actual bidders included Computer Installation Corp. of Houston, Data Services of Maplewood, N.J., and Computer Trade Corp., of Deer Park, N.Y., plus Comdisco. First bid was around $80,000.

Other attendees included Time Brokers, Inc., which ran the first auction last summer.

The quick success of this more recent auction was seen as a sign of better economic times by a gallery official, who stated he hoped to conduct another such auction before the end of the summer.

The computer was placed on auction by a court order, after the lessee went into bankruptcy, the gallery official stated. The original lessee remained anonymous through the proceedings, but the U.S. District Court here revealed separately that it was Computer Applications Inc.

Included in the configuration was a 1403 printer, four 2401 tape units, a 2841 storage control unit, plus tape controllers, a disk drive (2311) and a card reader/punch.

The CPU had decimal and floating point arithmetic capabilities, Basic 1401/1440/1460 compatibility and 64K of core storage.

BOAC-Russian Software Deal Could Give U.S. More Problems

LONDON – While the current battle between the U.S. and Britain continues over the proposed sale of ICL computers to Russia, a new computer-related issue appears to be in the making between the two.

The new issue could involve the sale of the British Overseas Airways Corp.'s Boadicea software reservation package to the Russian state airline, Aeroflot, the largest airline in the world.

Under a deal similar to the one under consideration, BOAC assumed responsibility for the purchase of the computers and implementation of the system for the Malaysia-Singapore Airlines. But the planned arrangement could cause new problems between London and Washington.

The Boadicea system is based on the IBM Pars-International package and has made extensive use of PL/1, and is tied to the IBM 360 or 370 computers, which are still under a trade embargo laid down by the U.S. BOAC said that this difficulty has been considered, but would not discuss possible solutions.

Meanwhile, the present battle over the sale of ICL computers to the Russian atomic energy center at Sepukhov is heating up.

Sir John Wall, chairman of ICL, hinted that the U.S. delay in approving the sale could help the American computer industry when it decides to move into the Communist bloc market, according to the London *Times*.

According to the story, Wall indicated that IBM was maintaining a large center in Vienna, with "several hundred" people, in preparation for a move into the Eastern bloc countries. He also is said to have complained of the excessive time that the U.S. Government has needed to make the decision on the sale.

Wall said that ICL has had to supply detailed information on the sale and the systems to the U.S. Department of Commerce. Members of the committee hearing the testimony said that there should be assurance that the U.S. Government would not make this information available to the U.S. computer industry.

Soviet Researchers Urge More Automation

MOSCOW – Computers may receive heavier emphasis here if a resolution suggested by researchers at the Institute of Economics of the Academy of Sciences is incorporated in the next five-year plan.

According to the Moscow *News Weekly*, the two have called on the government to "accelerate the use in production of the most progressive mathematical managerial methods, employing automatic systems of management and electronic computers."

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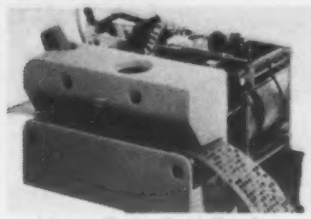
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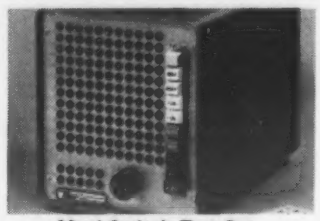
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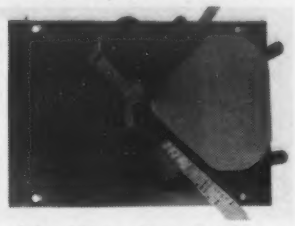
Adtrol Paper Tape Reader

Raytheon CK1469P CRT

Litton Adds 4 Roytron Readers

CARLSTADT, N.J. – One of four Roytron readers, priced at $995 from Litton Automated Systems, the Series 1300 punched paper tape and edge-punched card reader accepts punched paper tapes up to 1 in. wide and edge-punched cards up to a fan-fold width of 210 mm. The unit is equipped with a magnetic clutch, which can halt the data medium before the next character, at its reading speed of 200 char/sec.

The Model 1307 photoelectric punched tape reader reads punched tapes up to 1 in. wide at a speed up to 1,000 char/sec. It has a friction-disk magnetic clutch that can stop, at maximum speed, after the next character.

Series 1100 punched card and edge-punched card readers read punched cards at 200 char/sec and edge-punched cards with character-tone stop at 175 char/sec. Its card hopper holds up to 200 cards.

Litton is at 600 Washington Ave., 07072.

Set Tests Keyboards

MINNEAPOLIS – The Maxi-Switch Co.'s solid-state keyboard test set provides proper voltages without external power supplies or circuitry.

The appropriate code (Ascii or Ebcdic) is selected by a panel switch, and bit 8 is enabled if parity checking is desired. Positive or negative logic and odd/even parity are specified, and the input function mode (MOS or TTL) is determined, all by front panel push-button switches.

Any digital device which produces a MOS or TTL-coded output (up to 9 bits) in Ascii, Ebcdic or any other code, may be tested, according to the company at 3121 Washington Ave. North, 55411.

Paper Tape Reader Has High Speed and Low Price

BROOMALL, Pa. – The Model AR20 paper tape reader from Adtrol, Inc., reads standard paper tapes in either direction at speeds to 200 char/sec.

New OEM Products

The unit provides photoelectric reading with silicon sensors. All data amplifiers, motor drives and other critical electronic circuits are mounted on a single pc card which is an integral part of the reader and all signals are TTL compatible. The firm is at 700 Abbott Dr. 19008.

Character Generator Bows

SAN DIEGO, Calif. – Solitron has developed the UC7541, a monolithic, P-channel device designed for dot matrix character generation where column-by-column data output is desired.

Chip enable access time is rated at 350 nsec. Column select access time is typically 200 nsec, with typical character access time of 400 nsec. Typical power dissipation is 200 mW. Operating free-air temperature range is from −25° C to + 85° C with storage temperature range of −55° C to +150° C.

Each generator provides 2K bits of programmable storage available in two basic organizations: 64 words of 35 bits (5 cols, 7 outputs); or 32 words of 70 bits (5 cols, 14 outputs).

The firm is at 8808 Balboa Ave., 92123.

Raytheon Introduces CRT

QUINCY, Mass. – A rectangular cathode ray tube for computer readout displays from Raytheon Co., the CK1469P, is a 14-in. (diagonal) tube. It generates a maximum line width A of .010 in.

Focusing is electrostatic and deflection is magnetic. The tube is supplied with a 50% transmission etched bonded face panel to enhance contrast and to reduce first surface reflections in high ambient light. Approximate price, depending upon phosphor selected, is $95 in quantities of 100. Delivery is 60 days from the firm at 465 Centre St., 02169.

Spin Has Flying Disc Heads

SAN DIEGO, Calif. – Spin Physics' Series 914 Flying Disc Heads are compatible with drives employing 2316-type disk packs. They are designed for operation at 2,200 bit/in. with 100 track/in., and are available in torsion load and ramp load versions.

The 914 Series features a hot-pressed ferrite which results in a head with typical resolution and output of 2 mV peak-peak on inside tracks. The firm is at 625 Broadway, Suite 416, 92101.

ICC Announces Comrac 900

LOS ANGELES – Information Control Corp.'s Comrac buffer core memory system is a 19 in. rack mounted system featuring a 900 nsec full cycle time and 350 nsec access time with capacities up to 16K by 9, 8K by 18 or 4K by 36.

Operating temperature range is 0° C to +50° C; operating modes are read/restore, clear/write, buffer read, buffer write and read/modify/write.

The Comrac 900 with 4K by 36 capacity is $4,095; in quantities of 50 from ICC at 9610 Bellanca Ave., 90045.

Executive Corner

■ National Computing Industries of San Francisco has promoted Frank U. Beck to executive vice-president.

■ James A. Robinson was appointed a vice-president of Ferroxcube Corp., Saugerties, N.Y.

■ Julius Honig has been appointed vice-president of marketing for Digital Development Corp., San Diego, Calif.

■ R.O. Huch has been promoted to vice-president of marketing at Centronics Data Computer Corp., Hudson, N.J.

■ Datafile Systems Corp., Blue Bell, Pa., has elected Alfred K. Lifton vice-president of marketing.

■ Ticketron, Inc. of New York has named C.L. McCarty Jr. vice-president and general sales manager.

■ Richard E. Brindley has been elected president of Central Information Processing Corp., Baltimore.

■ Elizabeth R. Alexander has been appointed vice-president, Consulting and Curriculum Development, of Consultants Associated, Inc., Wakefield, Mass., a subsidiary of Edutronics Systems International, Inc.

■ John J. Haberstroh has been named to the new post of division vice-president, financial systems marketing for the Business and Industry Division of Bunker Ramo Corp., Trumbull, Conn.

■ Howard I. Morrison was appointed division vice-president of Automated Systems Corp., a division of Auerbach Associates, Inc., Philadelphia.

■ Andrew S. Huson has been named president and chief executive officer of Data Technology, Palo Alto, Calif.

■ George Goode has been appointed president of Datotek, Inc. of Dallas.

■ Engineering Computer Systems, Inc., Lexington, Mass., has appointed Herbert M. Norris vice-president of its corporate management staff.

■ E.M. Donovan has joined Control Data Corp. as vice-president of the company's Business Products Operations.

UK May Cut Assistance To Firms in DP R&D

CW European Bureau

LONDON – It is almost certain that the government here will cut back its assistance to firms engaged in computer research and development, but will continue some form of its "Buy British" policy, according to sources here.

Sir John Eden, Minister for Industry in Prime Minister Heath's conservative government, is expected to announce the decisions shortly and elaborate on the government's attitude toward the UK computer industry.

Contracts

PRC Information Sciences Co. of Los Angeles has received an $816,000 contract from the Naval Electronics Laboratory Center in San Diego to complete the development and documentation for the Message Processing and Distribution System, a communications system for the USS Chester W. Nimitz, a nuclear-powered aircraft carrier.

The California Senate Committee on Rules has awarded a $206,470 contract to Systems Development Corp., Santa Monica, Calif., for a computer-based information system to assist in the task of its 1971 reapportionment of the State Senate, Congressional Districts, and State Board of Equalization.

Applied Data Research, Inc. of Los Angeles has been awarded an additional contract, valued at $309,000, by the Jet Propulsion Laboratory in Pasadena for general software services.

The Air Force Systems Command has awarded a $98,500 contract to Vanzetti Infrared & Computer System Inc., Dedham, Mass., for its Inspect System (Infrared System for Printed Circuit and Electronic Component Testing), with options for additional systems.

Terminal Data Corp., Van Nuys, Calif., has received an order from Eastman Kodak, valued at $586,000, for TDC's microfilm recorders, with an option for additional units up to another $586,000.

Compuentry, Ltd., the Jamaican subsidiary of the International Compumedics Corp., has been named a subcontractor by the New York City Housing and Development Authority to provide keypunching and key verifying data.

PRC Computer Center, Inc. of Los Angeles has signed a contract to design and implement a prototype telegram billing system for the Western Union Telegraph Co.

Librascope Division of The Singer Co. has been awarded a $375,000 contract from The Boeing Co., Seattle, to manufacture a data printer for the Air Force's Short Range Attack Missile program.

POSITION ANNOUNCEMENTS POSITION ANNOUNCEMENTS

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Growth in the field of Automated Control Systems has created several positions in our Applied Programming and Software Services Group.

Our applications are with core and disk operating systems for mini and small processor computers which are an integral part of a monitoring and data acquisition system. The responsibilities of the Programmer-Analyst include the continued development of our application library for environmental systems and the development of future operating systems. We are seeking the inexperienced college graduate as well as people with experience in software development and/or applications.

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Sales Representatives – Large Electronic Core Memories. Dallas, San Francisco, N.Y., Boston, Philadelphia, other major cities. $20,000

Sales Representative – Software/terminals for Machine Control automation systems. $16,000

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Nickels & Dimes

Itel Corp. shareholders have "overwhelmingly approved" the acquisition of memory-maker **Information Storage Systems.** This was one of the last hurdles in the way of the acquisition, which calls for Itel to pay 2.6 million shares of stock to ISS shareholders. In the year ended Dec. 31, Itel made $4.3 million on sales of $67 million, while ISS made $3 million on revenues of $24 million. Itel has another toe in the memory field through Diablo Systems, which makes disks for minicomputer drives.

$$$

Computers seem to multiplying like rabbits in **Japan.** Dai-Ichi bank has reported that in the first six months of 1970 computer production rose a phenomenal 71% over the year earlier period. The annualized compound growth rate from 1966 to 1969 was 51.2%. In the first six months of last year total production was $395 million, according to Dai-Ichi, and the bank sees a continued 30% a year rise between now and 1975.

$$$

A block of 206,000 shares of **IBM** crossed the Big Board tape recently, and at $352 a share the total transaction was worth $72.5 million, the second largest in the New York Exchange's history – 200,000 of the shares were from the estate of the late Sherman Fairchild, founder of Fairchild Camera and Instrument. His father was a founder of IBM. The largest transaction took place in 1968, and was worth $76 million.

$$$

And bit by bit the **New York Exchange** is inching forward into the present. Latest effort is automation of odd-lot (blocks of less than 100 shares) business via switching computers which route orders to an odd-lot firm for pricing. Eventually the same system will be used for round lot trading, as well, identifying and routing an order to the post on the floor where the stock is traded.

$$$

Hazeltine, a new power in the low-cost CRT terminal market, has reported a net loss of $213,000 for the first quarter, on sales of $8.1 million. A year ago this time Hazeltine made $410,000, or 21 cents a share, on sales of $15.2 million. Big H President David Westermann cited defense spending cutbacks and startup costs in the Industrial Products Division as the villains. The order backlog is up to $51.5 million, though, from $32.3 million last year.

$$$

Bradford Computer has shown first quarter earnings of $391,000, or 13 cents a share, well up from $263,000, or eight cents a share, a year ago. Revenues were up to $2.6 million from $1.96 million for the period ended March 31. The New York firm specializes in large financial services.

Burroughs Posts Gains In Earnings and Revenue

DETROIT – Burroughs Corp., in the face of Wall Street disenchantment, has reported a 13% increase in earnings for the first quarter of 1971 and a 10% increase in revenue over last year's quarter. The 1971 first quarter established a new record for first quarter earnings and revenue.

Net earnings for the three months ending March 31 were $11 million, compared with $9.7 million in 1970. Earnings per share were 60 cents based on an average of 18,359,111 shares outstanding, contrasted with 56 cents last year on an average of 17,233,362 shares outstanding.

Estimated U.S. and foreign income taxes were $9.7 million for the 1971 first quarter, compared with $10.4 million in the 1970 quarter.

Revenue for the first quarter reached $208 million, a 10% increase compared with $189.2 million in the 1970 quarter.

Burroughs President Ray W. Macdonald stated that commercial incoming orders from both U.S. and overseas were up in the first quarter with all major product areas, excepting government custom contracts, exceeding last year's first quarter position.

Macdonald further indicated that first quarter backlogs increased over the year-end position.

Last month Burroughs was treated harshly by financial analysts who were worried about delays in delivery of some Burroughs software products. The company's stock fell several points as a result of the reports.

Ampex Makes Asset Revaluation For Further Loss of $9.5 Million

REDWOOD CITY, Calif. – After an accounting change that will cause a $10 million write-off, Ampex Corp. will take another $9.5 million loss in a revaluation of inventories in some of the company's divisions.

Chairman William E. Roberts has estimated that Ampex will show a dollar a share loss for the year ending May 1. He estimated that sales for the year will be about $300 million, off from last year's $313.6 million.

The inventory revaluation will cause a loss of 48 cents a share, and the $10 million R&D write-off will result in a loss of 50 cents a share.

In an interview Robert said that fourth quarter sales and earnings had dropped behind projections and made the inventory revaluation necessary.

Roberts' dollar a share loss prediction indicates that operations at Ampex will just about break even for the year. In the nine months' statement Ampex reported earnings of $2.7 million, or 25 cents a share – down from $11.4 million or $1.06 a share a year earlier – so fourth quarter results must be indicating a loss of over 25 cents a share.

A year ago the tape drive and memory maker reported earnings of $14.5 million, or $1.34 a share, before a $2.3 million special charge that shaved net earnings to $12.2 million or $1.13 a share.

The $10 million R&D writeoff was announced last March. Roberts noted then that Ampex had invested about $90 million in development over a six-year period, and $10 million was all that had not been expensed.

He noted that Ampex was switching to a more conservative accounting method and expensing all the remainder.

RCA Sees Sales Increase 8.6%, Earnings Drop

NEW YORK – Despite "further progress in domestic computer bookings," first quarter earnings at RCA dropped 6.7% to $23.8 million, or 30 cents a share, from $25.5 million or 33 cents a share last year.

Sales at the electronics conglomerate rose 8.6% to $908.1 million, from $836.3 million.

RCA chief Robert W. Sarnoff laid the blame for the poor earnings to "the continuing influence of the economic slowdown." In his statement he noted that "signs of a strengthening economy began to emerge in the latter part of the quarter."

The second quarter will be "substantially improved" from last year's, Sarnoff said. RCA was the victim of a lengthy strike in the second quarter of 1970.

The RCA head also predicted that profit will "gradually improve" in the second half of the year.

Noting that domestic computer bookings and new customer accounts were both higher than last year, Sarnoff also remarked that total factory shipments were less than a year ago. The reason for this, he said, was the change-over to new models and adjustments in customer shipping schedules.

Government defense and space business had increased as a result of accounting alterations and booking schedules, he noted, even though new business bookings were down.

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Honeywell 1st Period Net Shows 50% Drop; Sales Off

MINNEAPOLIS – In a report agreeing with projections made to the financial community nearly a month ago, Honeywell Inc. has reported that its first quarter sales and earnings were lower than a year ago.

Sales and rental revenues were $429 million, a 7% decline from restated sales of $461 million in the first quarter of 1970. Earnings were down 50% to $7 million, compared with $14 million a year earlier. Earnings per share were 40 cents, compared with 82 cents a year ago.

James H. Binger, board chairman, said: "Profits have been adversely affected by a variety of factors that have come to bear on us at the same time. We are hopeful that some of the modest signs of improvement we have seen will develop into a broad trend, but at this time a significant upturn in not yet apparent in our business generally."

Binger said first-quarter performance reflected continued impact of the recession on Honeywell's control systems business, a reduction in aerospace and defense revenues as expected, and a drop in the level of computers sold outright compared to those leased.

"Normally the balance of our business is such that there are enough plus factors to offset any areas of softness, enabling us to maintain growth in sales and earnings, but that has not been the case during this period," Binger said. He noted that the first-quarter figures of a year ago were especially strong.

"In the computer business," Binger said, "net orders were encouraging, especially in the U.S. Orders for our newly introduced Series 6000 large machines were substantially ahead of expectations."

Honeywell's computer rental and service revenues are ahead of a year ago, but sales revenues and profits were adversely affected by the fact that outright sales of computer equipment have been running at a lower level than in the first quarter of 1970, when sales were unusually high.

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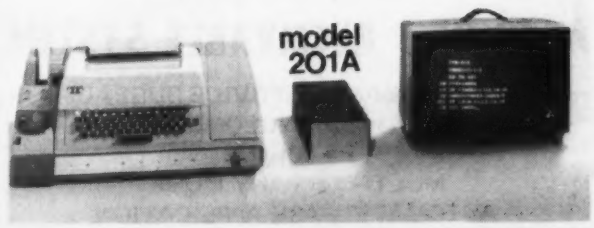

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A Visit With Nasdaq

Electronic Marketplace Helps Bring New Order to OTC

By Michael Merritt
CW Staff Writer

FORT NASDAQ, Conn. – That at least is what the Bunker-Ramo people call the squat building in Trumbull that houses the computer center for the National Association of Securities Dealers' (NASD) new electronic marketplace.

And while the building may seem oppressive, the system it shelters is one of the sprightliest successes in the checkered history of real-time, on-line computation.

Nasdaq – the less-than-graceful acronym for NASD Automated Quotation System coined by Arthur D. Little, Inc. when it was doing the initial studies on the system – has brought new order to the over-the-counter (OTC) securities market by providing the electronic equivalent of a central exchange.

In a few seconds (the contract specs call for less than five seconds 50% of the time and seven seconds 95% of the time) dealers across the country can check the offerings of market makers in thousands of unlisted stocks, or make and alter bids themselves if they are market makers, avoiding repetitious individual phone calls.

Because Nasdaq allows immediate comparisons of offerings of market makers (the securities dealers who specialize in trading certain stocks) with those of their competitors, the OTC market has gained a new stability and respectability.

Price comparisons are immediate and a broker can quickly find the best deal for his client. Price manipulations or phony bids are more obvious and easily policed.

Since its Feb. 8 opening brokers, traders and customers have praised the system.

In two months it has inspired blue sky predictions of revolution in the securities trading business. And it is threatening the New York and American exchanges with competition for the first time in recent history.

The Nasdaq system is basically a real-time, on-line inventory system of a size approaching that of the large airlines reservations systems. The recent troubles of United and TWA in getting their systems up have illuminated the difficulties inherent in such systems.

Bunker-Ramo, which implemented and runs Nasdaq, started with several advantages, among them a familiarity with the stock market that goes back to 1929 when the company started out as a maker of stock quotation boards.

Bunker-Ramo also made reservations systems for United Air Lines, TWA, and Braniff in the early and middle 1960s. United and TWA are still using the systems.

The company also had excellent cooperation from Univac, two of whose 1108s are the main processors for the system.

The Nasdaq project required extensive revisions of the Exec-8 operating system for the 1108, and according to Matt Purowitz, head of software development for Nasdaq, Univac agreed to make and support all the revisions Bunker-Ramo needed.

Nasdaq was designed and implemented in a shade more than two years. Purowitz praised his staff – 32 programmers in all – for their dedication in getting the system up and bug-free in such a short time.

The applications programming is written entirely in Assembly Language. There are programmatic recovery schemes that automatically reload if one of the CPUs goes out.

Purowitz said one of the reasons the system works so well is the constraints his people had to work under – time constraints, reliability, core size (so that the program could be swapped if one core box goes down), performance requirements – all of which comprised a challenge.

As one example of the tightness of the work, he mentioned that the applications use only the seven minor registers, rather than the larger number of major registers available on the 1108. The reason for this, he remarked, was to keep time overhead down.

220 Inquiries

The system is large. It is designed to handle a peak of 220 phone inquiries or updates a second. It may eventually handle 20,000 stocks, or inventory items. In addition to the 20,000 Telequote units that can be used for inquiry, it currently supports over 1,200 Nasdaq terminals.

Peak load so far has been 648,000 calls in one day.

Should the system crash, it can recover from a core or processor failure in 1.5 minutes and from an abort through program conflict in 15 seconds.

The contract requirements call for a maximum downtime of 10 minutes per week or three hours per year, and in over two months of operation, downtime has totalled two or three minutes, according to George Beltz, director of projects.

The reason for the reliability – other than the success of the software – is extensive redundancy and fail-soft provision.

The main processors are dual 1108s, drum-fed so that files are common and mutually replaceable. Memory is contained in three 65K units, and the system can operate on two of them (Exec takes up 40K and code and buffer 62K).

The physical arrangements of the center follow the backup philosophy, utilizing three different power sources, redundant heating and cooling equipment, and even two physically separate phone trunks leading from the building.

The communications are polled by eight concentrators located around the country. The units are based on HIS 516s, and perform some preliminary processing, freeing the 1108s from housekeeping overload.

There is special switching gear to cut in on-line spares in case of line failure on the 50 Kbit lines from New York or the double 4,800 baud lines from the other concentrators.

Raytheon 1st Quarter Earnings Show Rise

LEXINGTON, Mass. – Raytheon Co. has turned in first quarter sales, earnings and earnings per share modestly improved over the records established in the like period a year ago.

Earnings in the quarter ended April 4 were $8.9 million; equal after provision for preferred dividends to 62 cents a common share. This compares with restated earnings a year ago of $8.8 million or 58 cents a share.

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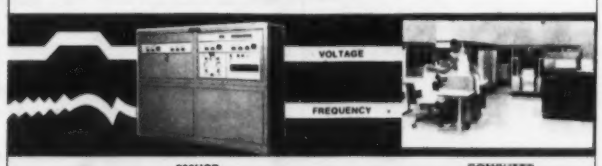

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Computerworld Stock Trading Summary

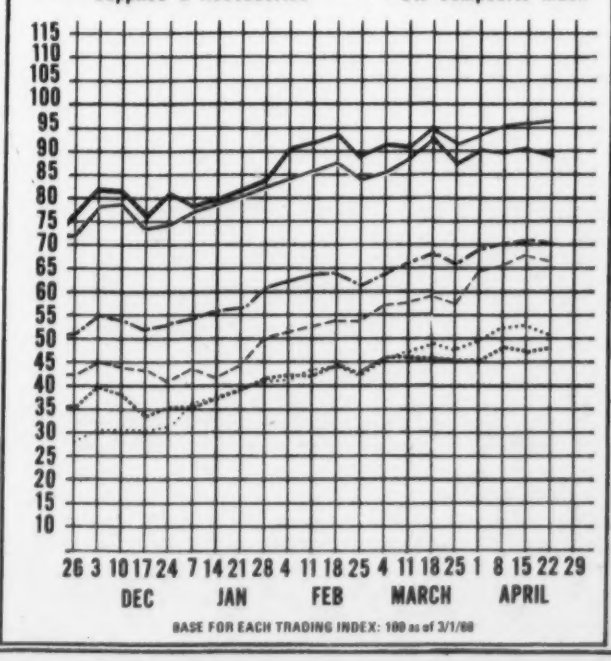
All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

CLOSING PRICES THURSDAY, APRIL 22, 1971

EXCH		1971 RANGE (1)	CLOSE APR 22 1971	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	2- 4	2 1/4	0	0.0
A	APPLIED DATA RES.	5- 13	9 7/8	+ 3/8	+3.9
O	APPLIED LOGIC	1- 3	1 1/2	0	0.0
O	ARIES	1- 2	1 3/8	0	0.0
N	AUTOMATIC DATA PROC	44- 59	57 3/4	+1 1/2	+2.6
O	AUTO SCIENCES	5- 8	5 1/2	- 1/4	-4.3
O	BOOTHE DATA SYS	1- 2	1 3/8	+ 3/8	+37.5
O	BRANDON APPLIED SYS	1- 1	7/8	0	0.0
O	COMPUTER AGE INDUS.	1- 2	5/8	- 1/8	-16.6
O	COMPUTER ENVIRON	1- 2	1 1/4	0	0.0
O	COMPUTER INDUS.	4- 5	5	0	0.0
O	COMPUTER NETWORK	3- 10	9 1/4	-1	-9.7
O	COMPUTER PROPERTY	6- 10	9	0	0.0
N	COMPUTER SCIENCES	9- 15	14	- 1/4	-1.7
O	COMPUTER TASK GROUP	1- 1	1 1/4	+ 1/4	+25.0
O	COMPUTER USAGE	5- 16	8 5/8	-1 3/8	-13.7
O	COMP AUTOMOT REPORTS	6- 13	13	+2 1/4	+20.9
A	COMPUTING & SOFTWARE	27- 45	42	-2 1/2	-5.6
O	COMRESS	2- 3	3 1/8	0	0.0
O	COMSHARE	4- 8	7 3/4	+1 1/4	+19.2
O	CONSOL. ANAL. CENT.	1- 2	1 3/4	+ 1/4	+16.6
O	DATA AUTOMATION	1- 4	2 3/4	0	0.0
O	DATA PACKAGING	7- 10	8 5/8	- 1/8	-1.4
O	DATAMATION SERVICE	1- 3	1 1/8	- 1/4	-18.1
L	DATATAB	4- 10	9 1/4	- 1/4	-2.6
O	DIGITEK	1- 2	2 1/8	+ 1/2	+30.7
O	EDP RESOURCES	7- 14	13 3/4	+1 1/2	+12.2
A	ELECT COMP PROG	3- 7	5 1/8	- 1/4	-4.6
N	ELECTRONIC DATA SYS.	61- 85	63	-11 1/4	-15.1
O	INFORMATICS	7- 13	13	+1 1/4	+10.6
A	ITEL	15- 23	22 1/8	- 3/8	-1.6
O	KEYDATA CORP	10- 14	12	- 5/8	-4.9
A	MANAGEMENT DATA	8- 11	9 1/4	+ 1/4	+2.7
O	NATIONAL CSS INC	7- 14	13 1/4	- 3/4	-5.3
O	NAT COMP ANALYSTS	1- 4	3 3/8	0	0.0
O	NAT.COMP. SERV.	2- 3	2 1/4	- 1/8	-5.2
N	PLANNING RESEARCH	16- 26	22 7/8	- 1/2	-2.1
O	PROGRAMMING METHODS	18- 29	22 1/2	0	0.0
O	PROGRAMMING & SYS	2- 4	2 7/8	- 1/4	-8.0
L	PROGRAMMING SCIENCES	1- 3	1/2	+ 1/8	+33.3
O	SCIENTIFIC RESOURCES	1- 2	7/8	- 1/8	-12.5
O	SOFTWARE SYSTEMS	1- 2	1 3/8	+ 1/8	+10.0
O	TBS COMPUTER CENTERS	5- 9	7 3/4	+1 1/4	+19.2
O	TOLLEY INTL CORP	3- 8	7 1/4	- 1/4	-3.3
O	UNITED DATA CENTER	2- 6	4 3/4	- 1/4	-5.0
N	UNIVERSITY COMPUTING	21- 32	27 7/8	-1 1/4	-4.2
A	URS SYSTEMS	7- 11	7 7/8	-1	-11.2
O	U.S. TIME SHARING	1- 3	2 5/8	+ 1/8	+5.0
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	24- 36	34 7/8	+1 1/2	+4.4
O	ALPHANUMERIC	3- 6	3 7/8	- 1/8	-3.1
N	AMPEX CORP	17- 25	21 3/8	-2 3/4	-11.3
O	ASTRODATA	1- 2	1 3/4	+ 1/2	+40.0
O	ATLANTIC TECHNOLOGY	3- 6	6 1/8	+1	+19.5
A	BOLT,BERANEK & NEW	6- 8	6 3/8	- 3/8	-5.5
N	BUNKER-RAMO	10- 17	15 3/4	- 3/8	-2.3
A	CALCOMP	23- 33	29 7/8	- 3/4	-2.4
O	COGNITRONICS	6- 9	6 1/8	- 3/4	-10.9
O	COLORADO INSTRUMENTS	4- 8	4 3/4	- 1/4	-5.0
O	COMPUTER COMMUN.	6- 19	13 3/4	- 3/4	-5.1
A	COMPUTER EQUIPMENT	4- 6	5 1/4	- 1/8	-2.3
A	COMPUTEST	13- 20	14 1/4	- 3/8	-2.5
O	CONSOL COMPUTER LTD.	8- 11	11	- 1/4	-2.2
A	DATA PRODUCTS CORP	6- 10	8 3/8	0	0.0
O	DATA TECHNOLOGY	3- 8	7 1/4	- 1/8	-1.6
O	DIGITRONICS	4- 8	5 5/8	+1 1/4	+28.5
N	ELECTRONIC M & M	8- 14	12 7/8	+ 1/8	+0.9
O	FABRI-TEK	2- 3	3 3/8	+ 1/8	+3.8
O	FARRINGTON MFG	1- 3	2 1/2	+ 1/8	+5.2
O	FOTO-MEM INC	2- 6	2 3/4	- 1/4	-8.3
O	INFOREX INC	31- 48	46 1/4	+1 3/4	+3.9
O	INFORMATION DISPLAYS	5- 8	6 5/8	- 1/8	-1.8
O	MANAGEMENT ASSIST	1- 2	1	0	0.0
A	MARSHALL INDUSTRIES	18- 27	25 5/8	+3 3/4	+17.1
A	MILGO ELECTRONICS	18- 26	21 3/4	+2 5/8	+13.7
N	MOHAWK DATA SCI	23- 41	40 5/8	+1 1/8	+2.8
O	ON LINE SYSTEMS INC	7- 18	16 3/4	- 1/4	-1.4
O	OPTICAL SCANNING	13- 18	14 5/8	- 7/8	-5.6
O	PHOTON	7- 12	10 1/4	- 5/8	-5.7
O	PHOTO-MAGNETIC SYS.	1- 1	3/4	- 1/8	-14.2
A	POTTER INSTRUMENT	17- 25	22 1/2	- 5/8	-2.7
O	PRECISION INST.	7- 14	11 1/2	+2	+21.0
O	RECOGNITION EQUIP	14- 26	24 1/4	+2 3/4	+12.7
O	REDCOR CORP.	5- 9	7 5/8	+ 3/8	+5.1
N	SANDERS ASSOCIATES	13- 22	19 1/8	-2	-9.4
O	SCAN DATA	6- 11	6 1/4	- 3/4	-10.7
O	TALLY CORP.	11- 16	13 7/8	- 1/8	-0.8
N	TELEX	15- 22	20 1/8	- 5/8	-3.0
O	VIATRON	1- 4	1	0	0.0
	SUPPLIES & ACCESSORIES				
N	ADAMS-MILLIS CORP	14- 19	15 1/2	-1 1/2	-8.8
O	BALTIMORE BUS FORMS	6- 10	9 1/4	- 3/4	-7.5
A	BARRY WRIGHT	8- 13	10 1/2	- 1/8	-1.1
A	DATA DOCUMENTS	18- 29	23 3/4	0	0.0
O	DUPLEX PRODUCTS INC	8- 10	9 1/8	- 3/8	-3.9
N	ENNIS BUS. FORMS	10- 13	11 1/8	-1 7/8	-14.4
O	GRAHAM MAGNETICS	9- 33	31 1/2	-1	-3.0
O	GRAPHIC CONTROLS	6- 12	11 5/8	- 5/8	-5.1
N	MEMOREX	54- 78	59 3/8	-2 7/8	-4.6
N	3M COMPANY	96-117	115 5/8	+3 3/8	+3.0
O	MOORE BUS. FORMS	37- 42	41	+ 1/8	+0.3
N	NASHUA CORP	29- 45	44	+3 7/8	+9.6
O	REYNOLDS & REYNOLD	37- 52	50 1/4	+1	+2.0
O	STANDARD REGISTER	19- 23	22 1/8	+ 3/8	+1.7
O	TAB PRODUCTS CO	8- 14	11 3/4	0	0.0
N	UARCO	25- 30	27 3/4	- 5/8	-2.2
A	WABASH MAGNETICS	8- 10	8 7/8	- 3/8	-4.0
N	WALLACE BUS FORMS	18- 26	24 1/2	- 1/4	-1.0
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	105-130	126 3/4	-1 1/4	-0.9
N	COLLINS RADIO	14- 20	19 1/4	- 3/8	-1.9
N	CONTROL DATA CORP	48- 72	72	+5 3/8	+8.0
O	DATA GENERAL CORP	19- 40	38 5/8	-1 1/8	-2.8
N	DIGITAL EQUIPMENT	53- 73	72 7/8	+3 1/2	+5.0
N	ELECTRONIC ASSOC.	5- 8	8 1/4	+ 7/8	+11.8
A	ELECTRONIC ENGINEER.	5- 9	8 3/8	+ 1/8	+1.5
N	FOXBORO	25- 41	38 7/8	+ 7/8	+2.3
O	GENERAL AUTOMATION	12- 26	18 1/4	-3 3/4	-17.0
N	GENERAL ELECTRIC	94-120	120 3/8	+1 1/8	+0.9
N	HEWLETT-PACKARD CO	30- 45	39 1/4	- 7/8	-2.1
N	HONEYWELL INC	83-115	99 5/8	-10 3/4	-9.7
N	IBM	310-364	352	-4 1/4	-1.1
O	INTERDATA INC	6- 11	10 1/4	0	0.0
N	NCR	38- 47	42 5/8	+ 3/8	+0.8
N	RCA	26- 37	36 1/2	- 1/8	-0.3
N	RAYTHEON CO	27- 40	39 5/8	+ 1/8	+0.3
O	SCI. CONTROL CORP.	1- 2	1	- 1/4	-20.0
N	SPERRY RAND	25- 38	35 1/2	-1 7/8	-5.0
A	SYSTEMS ENG. LABS	14- 18	14 7/8	+ 1/8	+0.8
N	VARIAN ASSOCIATES	13- 18	17 1/8	0	0.0
N	VICTOR COMPTOMETER	17- 27	21 3/4	+ 1/8	+0.5
N	WANG LABS.	29- 47	45 1/4	-1 1/4	-2.6
N	XEROX CORP	85-110	103 1/8	-3 3/4	-3.5
	LEASING COMPANIES				
O	BOOTHE COMPUTER	13- 27	25 3/4	-1 1/4	-4.6
O	BRESNAHAN COMP.	2- 4	3 1/2	0	0.0
O	COMPUTER EXCHANGE	4- 9	4 7/8	- 1/8	-2.5
A	COMPUTER INVSTRS GRP	8- 13	12	-1 1/8	-8.5
N	DATA PROC. F & G	11- 19	17 1/2	- 1/2	-2.7
O	DATRONIC RENTAL	2- 4	3 1/8	- 1/8	-3.8
A	DEARBORN-STORM	24- 42	41 1/2	+1 1/2	+3.7
A	DIEBOLD COMP. LEAS.	5- 11	9 5/8	- 1/2	-4.9
A	DPA, INC.	4- 8	7 1/4	0	0.0
A	GRANITE MGT	9- 13	11 1/4	+ 3/8	+3.4
A	GREYHOUND COMPUTER	7- 11	9 1/4	- 7/8	-8.6
N	LEASCO CORP	16- 22	19 7/8	-1 1/8	-5.3
O	LECTRO MGT INC	2- 4	3 1/8	+ 1/8	+4.1
A	LEVIN-TOWNSEND CMP	5- 9	6 7/8	- 1/4	-3.5
O	LMC DATA, INC.	1- 1	1	0	0.0
O	NCC INDUSTRIES	3- 8	6 5/8	- 3/4	-10.1
O	SYSTEMS CAPITAL	3- 6	3 1/4	- 1/8	-3.7
N	U.S. LEASING	16- 23	22 5/8	+ 5/8	+2.8

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Computer Stocks Trading Index



BASE FOR EACH TRADING INDEX: 100 as of 3/1/68

Earnings Reports

EDP RESOURCES INC.
Nine Months Ended Jan. 31

	1971	1970
Shr Ernd	$.17	$.28
Revenue	9,793,135	8,188,262
Earnings	131,732	209,209

SANDERS ASSOCIATES INC.
Three Months Ended Jan. 31

	1971	1970
Shr Ernd	$.04	$.04
Revenue	40,475,000	46,424,000
Earnings	182,000	178,000
6 Mo Shr	.08	.06
Revenue	78,184,000	84,809,000
Earnings	375,000	265,000

COMPUTEST CORP.
Three Months Ended Feb. 28

	1971	1970
Shr Ernd	$.04	$.30
Revenue	2,041,720	3,693,123
Earnings	42,305	283,580
9 Mo Shr	.42	.62
Revenue	7,540,908	8,229,314
Earnings	394,248	580,278

ELECTRONIC ASSOCIATES, INC.
Year Ended Dec. 31

	1970	1969
aShr Loss	$1.95	$.86
Revenue	30,960	41,224
Spec Chg	3,996	.....
Loss	8,995	2,222

a-Based on income before special charge.

CALIFORNIA COMPUTER PRODUCTS
Six Months Ended Jan. 3

	1971	1970
Shr Ernd	$.43	$.10
Revenue	20,827,889	10,357,880
Earnings	991,365	231,883

FABRI-TEK INC.
Three Months Ended Jan. 1

	1971	1970
Shr Ernd	.....	$.05
Revenue	$4,091,477	5,753,995
Spec Chg	a183,730	.....
Earnings (Loss)	(1,318,956)	144,370
9 Mo Shr	.....	.13
Revenue	14,163,165	15,025,016
Spec Chg	a183,730	.....
Earnings (Loss)	(2,007,065)	399,664

a-Write-off of good will for Fabri-Tek Information Management Inc.

COMPUTER INSTALLATIONS
Year Ended Dec. 31

	1970	1969
Shr Ernd	$.36	$.49
Revenue	1,579,432	2,692,251
Earnings	282,457	382,742

ELECTRONIC COMPUTER PROGRAMMING INSTITUTE
Year Ended Dec. 31

	1970	1969
Revenue	$2,963,741	$3,265,865
Spec Item	a11,161	b183,662
Loss	228,197	232,215

a-Credit; gain on sale of subsidiary. b-Debit; losses from discontinuance of certain franchise programs.

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FACT 1

CODING When writing Cobol programs, MetaCOBOL has the most comprehensive Cobol macro facility available. One that provides: complete freedom to produce your own verbs (macros) and abbreviations; ADR-supplied macros including new Cobol verbs, abbreviations, analysis macros, plus Decision Table macros and Report Generator macros; and many more features.

FACT 2

TESTING When preparing test data, MetaCOBOL provides comprehensive data with a minimum of programmer effort. MetaCOBOL also performs Syntax Checking and can generate JCL statements.

FACT 3

STANDARDIZATION MetaCOBOL lets you *establish* and *enforce* your Cobol implementation and installation standards.

FACT 4

DEBUGGING When debugging Cobol programs, MetaCOBOL offers the most significant advances ever designed. These include all output in source language format. Selected trace on abnormal termination. Continued execution on abnormal termination. List of unexecuted paragraphs. And a frequency count of executed paragraphs.

FACT 5

EVALUATING When evaluating the performance of your Cobol program, MetaCOBOL is the only system that can perform this function at the source level and during execution.

FACT 6

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